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THE PAYNE TARIFF ACT COMPLETED.

The Payne Tariff Act was passed by the Senate and signed by President Taft on Thursday, Aug. 5th. The act became effective on August 6th, according to the provision in the last section of the instrument; and thus the work of the extra session of Congress was completed. With the final passage of the bill, a sigh of relief went up throughout the length and breadth of the country.

The tariff agitation, coming as it did directly after the financial depression of 1907 and 1908, caused a general feeling of uncertainty in the business world; and no commitments were made, other than to supply immediate needs. Every one has looked forward to the final passage of the bill as an end of the halting tendency in trade, whether the act as finally passed would be generally satisfactory or otherwise.

The fact became apparent very soon after the bill was introduced that no drastic changes were to be inaugurated. A comparison of the new law with the Dingley tariff act shows that the metal, wool and cotton schedules underwent greater changes than the others.

A feature of Schedule I, relating to cotton manufacture, is that the duties on coarse counts of yarns are reduced. This affords the South, where these yarns are made, less protection than under the Dingley bill, while the duties on the finer yarns and cloths are increased in some instances over 90 per cent. above the Dingley ad valorem rate. Thus is provided more protection to the Eastern mills making this class of goods, than under the previous law. The duties on knit goods were materially advanced, and give the manufacturers even more protection than is apparent by simple comparison with the Dingley tariff, owing to the fact that trade agreements inaugurated by former President Roosevelt indirectly reduced the duties on knit goods from the Dingley schedule. It has been estimated that the total average increase in the cotton schedule is 28 per cent.

High hopes were entertained at one time by the farmers of the South that bagging, under Schedule J, for baling cotton would go on the free list, but they were later disappointed, as the duty of 6-10 cent per square yard remained the same as under the Dingley law. Again does the tariff bear heavily upon the South, and the efforts of the men who championed the cause of the Southern cotton grower were fruitless.

The duties on wool and manufactures of wool, under Schedule K, are practically the same as those under the Dingley law. Strenuous efforts were made by different merchants' associations of the country for a reduction in this schedule, but their efforts were opposed by the wool manufacturers' associations, and by the Western interests representing the wool growers of that section.

The tariff schedule is manifestly a document which could not possibly be formed entirely according to the wishes of the manufacturer and the consumer. The manu-

facturer, of course, has his own interest in view and wants all possible protection. The consumer, on the other hand, has to buy these articles for his existence, and very naturally wants to purchase them at the lowest possible price.

One of the sections in the new law provides for an excise tax of one per cent. on the net incomes of corporations, and is known as the corporation tax. Any corporation whose net income does not exceed $5,000 for any year is exempt from the tax.

A maximum tariff of 25 per centum ad valorem additional to the minimum tariff which is that shown in the schedules, may be levied, if, in the opinion of the President of the United States, the country from which the goods are imported is discriminating against the products of this country in the way of tariff rates, etc. This maximum rate becomes effective on March 31, 1910.

THE ROCKINGHAM POWER CO.

A revolution of the greatest magnitude is now under way in the South. The enormous latent power of our countless streams and rivers is being rapidly developed, and the significant term "hydro-electric power" is becoming a very familiar expression in the textile industry of the South.

The stupendous wealth lying dormant in this practically undeveloped source of power has already attracted the attention of Northern capitalists, who through years of training and experience can gauge the ultimate value of undeveloped resources with greater rapidity and certainty than a man of ordinary affairs; and they appear to be always ready to give aid to a movement for development.

It very often happens too, that a man who conceives the idea of developing a water-power has not sufficient capital to launch the enterprise, and his natural move is to call upon the Northern wealth to aid him.

That care must be exercised in bargaining for financial backing, if control of the property is to remain in the originator's hands, is well illustrated by the case of the Rockingham Power Co. of Rockingham, N. C.

The plans for the development of water-power on the Yadkin River near Rockingham, N. C., were conceived by Hugh MacRae & Co., bankers of Wilmington, N. C. The location is an ideal one for harnessing the river and is well adapted for a distributing point for power. This latter consideration is a very valuable one, owing to the fact that the plant is practically located right in the heart of a thriving cotton mill section that can very advantageously use its hydro-electric power.

The originator's first move was to buy up the riparian lands where the plant was to be located, and then secure a franchise from the State for development of power.

Armed with these essential factors, it was a comparatively easy matter to approach some of the great capitalists of the country and secure their financial backing.

It so happened that the men who were approached and who gave their support to the project were well organized to engage in such enterprises, and either controlled or had subsidiary concerns equipped for the work, from digging the foundation to installing the water wheels. The whole cost of the Rockingham Power Plant was originally estimated at $1,980,000 by engineers, after making a careful survey of the property.

A mortgage on the property was executed to a New York trust company, and bonds were issued to the amount of $2,200,000, with preferred stock of the company as a bonus.

MacRae & Co. took considerably over $1,000,000 of the bonds and disposes of part of them among their Southern customers. The power plant had already secured contracts for supplying power which would insure payment of interest on the bonds and ten per cent. dividends on the preferred stock issue, when the plant was completed.

The stock control went to MacRae & Co., who could thus have dictated the policy of the new enterprise, but the New York stock owners persuaded the controlling interest to form a voting trust which reversed the control. That this was evidently a grievous error, was shown by future developments in the company's affairs. The contracts for the work were let to financiers' contractors; and the MacRae interests were outvoted on disputed points at the meetings of the voting trust. All of the original estimates for the work were being far exceeded by actual cost, and the affairs of the company were approaching a precarious state.

Realizing the mistake of relinquishing control of the company by forming the voting trust, MacRae & Co. appealed to the Supreme Court of North Carolina to restore the right to the stockholders to a voice in the conduct of the affairs of the company.

It is said that the New York members of the voting trust retaliated by arranging for one of the contracting concerns to apply for a receiver for the Rockingham Power Co.; this was granted by the court, the funds having been exhausted.

The recent sale of the property at auction brought to an end the efforts of its originators to realize what promised to be a highly successful enterprise. The plant was purchased by a representative of the bondholders for $1,000,000.

SELF HELP.

The familiar aphorism, "The world helps him who helps himself," finds expression probably more than any other maxim of the present day, because of its proven worth as a principle to follow in one's everyday life.

These few words have a very broad scope and are capable of various interpretations by persons in various walks of life. The beauty of them lies in the fact that they are readily applicable to each individual case.

We are naturally interested in the phase which appeals to textile men, from the operative to the president of the mill. The desire of a man to advance himself to a higher position in his chosen work, is born of an ambition to push onward to a higher accomplishment than he has yet attained.

Ambition is the first factor requisite for progress; but very often an ambitious man is seriously handicapped by a lack of knowledge. We often see a man who is ready and willing to make any sacrifice necessary to improve himself, but who doesn't have a sufficient mental grasp of the situation to use his inherent power to the best advantage. His measure of success is thus naturally restricted, and his real efficiency is never fully developed.

The progress of a man in these days of enlightenment is dependent to a great extent upon a comprehensive knowledge of every phase of the work in his line. In all branches of industry, it is the man with the knowledge, the exact

knowledge of the subject in hand, who wins in the fiercely competitive struggle for success. A vast amount of a man's knowledge is obtained by personal experience; but this is necessarily very limited compared to the broad range of information which pertains to any subject. In cotton mill work this is especially true. A mill man may gain success through his personal observation and experience, but the man who mounts highest is the one who, in addition to his own hard earned experience, has the experience of others in this field to guide him. This comprehensive view is only obtained by consistently reading matter which contains this technical and practical information.

The average mill man will say, perhaps, that he has not the time for this reading; that he lacks the necessary direction; and that he can not afford expensive technical works. This is in a large measure true.

While some men, such as engineers, have spare moments for reading even while on duty, the nature of textile work requires a man to be practically always on his feet; and his duties require unremitting attention.

The only time left to a mill man for reading is at night. No doubt it is hard to spend this time reading and studying, continuing the work of the day. It is easy to fall into the habit of dropping work and anything that pertains to it the moment the whistle blows, and devoting the remainder of the evening to recreation.

But the man who achieves success must follow a different plan.

It is an axiom that to gain an end, one must give up an indulgence. It is this sacrifice that a man must make if he would rise above the ordinary run of men.

It is astonishing to know the amount of comprehensive knowledge that can be gained by thirty minutes of reading every day. A well known educator in the South, now president of one of its leading technical colleges, has regularly advised students to form a habit of devoting a definite amount of time every day to reading.

This is good advice to every one. So, let the mill man spare this time from his leisure hours, for conscientious study, and he will soon improve himself in every way. As time passes, he will find the study that was once a drudgery full of interest; one of his pleasures, in fact. Not only this, but he will have acquired unconsciously a facility for concentration and assimilation.

This increase of information and efficiency can but be apparent to his superior in the mill; and he will find that the time spent in study has been the most fruitful in his career.

An all important point in this connection is to procure the necessary literature pertaining to the textile industry. The purpose of a textile magazine is to bring the necessary information to the textile man, so that he may readily have a means of improving a few spare moments. Both current and elementary information bearing on the textile industry is published. In other words, a magazine such as COTTON is supplying information relating to the textile industry as a help to those who desire to help themselves. There is now a department in the magazine devoted to textile questions and answers. The facilities of the magazine are open to its readers.

In your study, if there are any perplexing problems that you find, and a little definite information will set you right, this magazine will be glad to help you.

Again, if you have any phase of the textile industry firmly fixed in your mind, try writing your thoughts on the subject. When you complete the work, we predict that you will have a clearer view of the subject than ever before. In fact, we venture to predict that in a great many instances some points will arise which were thought to be clear, but when put down definitely on paper, required a little more positive knowledge on the subject.

NATIONAL ASSOCIATION OF COTTON MANUFACTURERS TO MEET.

The regular semi-annual meeting of the National Association of Cotton Manufacturers will be held at the Mt. Washington Hotel, Bretton Woods, N. H., on September 22 and 23. This will mark the eighty-seventh meeting of the Association. Pres. Chas. T. Plunkett, who has made an extended tour of Europe, will return in time for the meeting and is expected to give some of his impressions of English and Continental methods of cotton manufacturing.

Hon. Henry P. Quimby, Governor of New Hampshire, will make an address of welcome to the Association. Albert Farwell Bemis is expected to present a continued report of the work of the committee on Standard Specifications for Staple Grey Goods, which subject has been under consideration for some time. We give below a list of papers which are expected to be presented at the meeting, but in some instances the presentations are contingent upon the return of the authors from foreign trips. The papers are:

"Accidents to Cotton Mill Operatives."

"America's Monopoly of Cotton Production—Is it Permanent?"

"Cork Inserts as applied to Textile Machinery."

"Housing Mill Employes."

"Increasing the Efficiency of the Man and the Machine."

"Mechanical Cleaning of Cotton Machinery."

"Reinforced Concrete for Mill Construction."

"Sizing."

"Starches for Mill Use."

Steam Generation for Cotton Mills."

"The Commercial Values of Coal."

"The Labor Problem in Relation to the Cotton Production."

SOFT YARN SPINNERS MEET.

The Southern Soft Yarn Spinners' Association met in Asheville, N. C., on August 7th, with from twenty to thirty members in attendance from Virginia, North Carolina, South Carolina, Georgia, Alabama, and Tennessee. The meeting was called at that time in order to discuss the situation in the soft yarn business.

No definite statement as to the business transacted was given out, but it was gathered that there was to be a general curtailment in the soft yarn output within the next thirty days. The directors will advise each member privately what course they desire him to pursue in carrying out their general plan. While conditions in the yarn trade have been very unfavorable and unsatisfactory for more than a year, the majority of the spinners are sanguine of the future. Everything now rests upon the size of the cotton crop, and matters are being delayed in order to secure more definite information on this subject.

THE STANDARDIZATION OF COTTON GRADES.

Carrying out the authority vested in the Secretary of Agriculture at the last session of Congress, through the efforts of Representative Burleson of Texas, to establish a standard for the different grades of cotton, calling to his assistance for that purpose expert cotton classifiers, by fixing a standard of middling cotton and using same as a basis establishing a standard of nine different grades to be designated middling fair, strict good middling, good middling, strict middling, middling, strict low middling, low middling, strict good ordinary, and good ordinary,—there was convened in the city of Washington on February 1, 1909, a committee of representative men engaged in various phases of the cotton business to act in the capacity of expert advisers in establishing the grades. The committee also had the services of three expert cotton classifiers to aid them in their work. The committee organized with Nathaniel N. Thayer of Boston as chairman, the remaining members being Joseph A. Airey of New Orleans; J. S. Akers of Atlanta; Clifton P. Baker of Boston; F. M. Crump of Memphis; Jno. Martin of Paris, Texas; Geo. W. Neville of New York; Lewis W. Parker of Greenville, S. C., and Charles A. Vedder of Galveston. The expert classifiers were Jas. R. Taylor, Dallas; Jules Mazerat of New Orleans; and W. P. Barbot of New York. The Secretary of Agriculture was further authorized "to prepare in practical form the standard of said grades and furnish the same upon request to any person, the cost thereof to be paid, when delivered, by the person requesting the same, and certified under the signature of the said Secretary and the seal of his department."

The department furnished the committee every facility for its work, having on hand types of cotton from the different exchanges and markets, and materials for making up the grades as provided by law. The committee spent the better part of three days in a discussion of the various matters involved in the establishment of the grades as authorized by law, and on February 3, submitted its formal report to the Secretary of Agriculture, which has now been approved.

The report of the committee stated that, having been called upon by the Secretary of Agriculture to assist him in the establishment of a standard of middling cotton and using the same as a basis, establishing a standard of nine different grades to be designated middling fair, strict good middling, good middling, strict middling, middling, strict low middling, low middling, strict good ordinary, and good ordinary, in pursuance of the terms of the Act of Congress upon the subject, which standards should be the official standards of cotton classifications, it begged to advise that representative types of each of the grades of cotton referred to above had been made up, and delivered to the Department of Agriculture.

In addition to the formal report submitted, the members of the committee made certain suggestions to the Secretary. These suggestions called attention to the fact that the characteristics recognized in the establishment of the grades are those generally used in the trade at the present time. It seemed to the committee, however, that at some time in the future it might be necessary to include other specifications in the standards other than those now considered; namely, length of staple, and strength of staple. Suggestions were also made to the Secretary regarding the practical questions involved in the preparation and distribution of the standards. It was the express wish of the committee that the government should at all times maintain the strictest supervision of the preparation of the standards, and that the standards prepared should be safeguarded in every way by such legislation as may be necessary to prevent their being handled or tampered with. It was strongly urged by the committee that steps immediately be taken to secure the concurrence of foreign exchanges in these standards. Owing to the fact that at the present time, transactions are being made in contracts fully a year ahead, on the exchanges in America, it was believed that in order to avoid confusion, the standards certified should not go into use in the trade prior to September 1, 1910. It was pointed out that it would be unfortunate to have the standards used as a basis of sales in the middle of the cotton season, and that they could not be used the coming season without great injustice and confusion.

The committee finally called attention to the fact that it had had opportunity to carefully examine all foreign standards submitted, also those submitted by the various cotton exchanges of this country, and that as a result of these examinations and the discussions held, it is believed that the least confusion would arise to the cotton business of the country by adopting a classification of cotton that was acceptable to all foreign consumers; but owing to the action of Congress, the committee found it necessary to confine itself to stated names which are in use in this country. The standards adopted are those that are in use in practical every-day business throughout the greater part of the cotton belt, and are the standards that are accepted in commercial practice between this country and Europe.

In order for the cotton trade to become fully acquainted with the grades, the Department of Agriculture will in a short time place sets in the hands of a limited number of associations, organizations, exchanges and agricultural colleges for inspection. These sets will enable the cotton producers, cotton merchants and spinners to become familiar with them.

COMMENT ON COTTON CLASSING.

Especial interest is attached to the subject of cotton grading at the present time, owing to the recent approval of standard grades for cotton submitted by a special committee to the Secretary of Agriculture.

The following letter was received by our Mr. Earle from Geo. W. Neville who served on the special committee of cotton grading, appointed by the Secretary of Agriculture. The letter has reference to the article on Cotton Classing published in the August issue.

The letter follows:

DEAR SIR: I am just in receipt of the August edition of COTTON and have read with a great deal of interest your contribution on cotton classing. One part of your article appeals to me strongly, and that is the variation in the quoted differences in the various markets on grades above and below middling, and the difficulty there is in harmonizing these differences, to one who is not conversant with the quality of cotton raised in each locality and the nearby markets.

Your comment regarding the difference in quotation between Houston and Galveston markets, for instance, is a

very striking one. I have been arguing for years, that there must be some spinning value between the various grades, as compared to middling, which would be a satisfactory one for the spinners to base their purchases on, as compared to the price of the middling cotton, which is a basis for all contract markets. The natural output of the cotton crop is such that no even running or average contract could be used as a basis for the contract markets, consequently all contract markets have to be broad enough to take in all of the spinnable cotton that is grown by this country.

On page 393, you give the "average per cent. of the impurities in the various grades, assuming other qualities to be uniform," and later on you show where the impurities are taken out in the manufacturing process, and give the result of an experiment made with good middling cotton. If you have made experiments along this line with other grades, the results will no doubt be very interesting.

As you doubtless know, cotton is divided between full grades and half grades in this country, and in full grades, half grades and quarter grades, abroad, the full grades being designated as follows:

Middling fair.
Good middling.
Middling.
Low middling.
Good ordinary.

The good ordinary grade is the lowest white that is tenderable on any contract market, so if you could give the total loss in manufacture on good middling, middling, low middling, and good ordinary, the information would be of value to all textile men.

The matter is of such importance to the entire cotton industry from the producer to the manufacturer, that it is a wonder that this phase has not been gone into more extensively before now.

THE COTTON CARNIVAL.

The first annual Cotton Carnival of Galveston, Texas was held in that city during the first week of August. Malcolm Graham of Galveston, first conceived the idea. The object of the carnival was to disseminate information, and promote a greater interest in all matters pertaining to the culture, handling, marketing, and manufacture of the cotton crop. A large cotton palace was erected for exhibiting purposes, and various exhibits of cotton and its products were shown.

One of the most interesting and instructive exhibits consisted of baled cotton, just as it is compressed in China, Africa, India, Egypt, Ceylon, Peru—in fact, all countries of the earth where cotton is grown were included. With each display of the baled product, there were also collections of the fiber as they appeared before being compressed. A number of American bales were also on exhibition, which showed decidedly inferior baling when compared with these foreign bales.

The Chinese bale was probably the best example of cotton baling.

It was put up in a clean, neat, and compact style. The bales were covered with a wrapping which resembled the material from which tow sacks are made. Dirt can not possibly get to the cotton, nor can the bales break open under ordinary conditions.

The ties are put on very close together, and are noticeable on account of the absence of "spiders." As is generally known, "spiders" are the projecting ends of the ties, where they are riveted together. These ends form sharp, cutting points upon every bale of cotton, and countless injuries occur among workmen handling the bales.

The fleecy staple in various grades, from all over the world was exhibited, properly labeled. American cotton led all the others as far as grade was concerned.

The textile department of the Agricultural and Mechanical College of Texas had quite a large exhibit, and gave a very complete exposition of the treatment of cotton from its raw state to the finished fabric.

CURTAILMENT IN EUROPE.

Coincident with the high price of cotton, the leading textile countries of Europe are carrying out a concerted plan of curtailment of their product. It appears that these manufacturers are in a very unfavorable position, as their supplies of raw cotton are very much lower than the average supplies of mills in this country. The English mills have to a great extent been running on short time for some weeks, the curtailment varying from one to four days per week.

The short-time movement is under the direction of C. W. Macara, president of the International Cotton Federation, who gave a report of the short-time movement outside of England, at the annual meeting of the English Federation of Master Cotton Spinners' Associations, held in Manchester on July 27, as follows:

Ever since our return from the International Congress at Milan, we have used the utmost endeavors to persuade all the countries affiliated to the International Federation to adopt short-time working. During the last few weeks there has hardly been a day on which we have not sent extensive telegrams and long letters to those countries where at first there were great difficulties to get the movement adopted. I have now great satisfaction in reporting to you the following progress in the matter:

Germany.—All the spinners' associations have adopted a ten hours' day, instead of eleven, during the whole of this half year. This gives a reduction of over 150 hours. The associations consider this only as a preliminary measure, and will shortly propose further curtailments.

France.—The most important districts of France, viz., the North and Normandy, have reduced their working time by one day per week for 12 weeks, and no effort is spared in obtaining the adhesion of the remaining district, the Vosges.

Austria.—A curtailment of production of one-sixth during six months has been adopted, and a further reduction of one day per week during twelve weeks has been proposed.

Italy.—The mills of the Italian association have recently finished ten weeks' short time of one day per week, and efforts are being made to continue this curtailment on an organized basis; meanwhile individual short time is worked to a great extent.

Spain.—The production has been reduced by 20 per cent. and this will continue until at least October-November.

Portugal.—Short time is being worked to about the same extent as in England.

Switzerland.—The association has recommended short time of one day per week during twelve weeks, but the ballot has not yet been completed; meanwhile a number of concerns are on short time.

Belgium.—The ballot has not yet been completed, but the prospects for the adoption of short time are favorable.

Russia.—Half of the consumption by the mills is Russian cotton. As the spinners' association in this country has been established only last year, the organization is not yet powerful enough to enforce short time. However, the working hours in Russia have recently been reduced.

Holland.—Short time has not yet been adopted. There are altogether only twelve mills, in ten of which weaving and spinning are combined, and only two are purely spinning mills. We are continuing our efforts to persuade the Dutch mills to fall into line.

Norway has only a very small number of spindles and the mills are long distances apart. So far no short-time movement has been practicable in this country.

Japan.—Owing to the long distance from this country, we have not yet received a definite reply to our appeal, but as only one-fifth of the consumption of the Japanese mills is American cotton, the adoption of short-time in this country is not so essential. Japan ran organized short-time in 1908.

The American associations have been approached to join in this movement, but explained that immediately after the 1907-1908 crisis the Northern mills at once reduced their working hours by about 50 per cent., the Southern mills following a few months later. Owing to this action American manufacturers are now in a very good position, and signs of a trade revival are generally in evidence."

Mr. Macara said that he was greatly indebted to the presidents of the associations affiliated to the International Federation for their self-sacrificing and energetic work to carry out the resolution passed at Milan.

OBITUARY.

Christopher P. Brooks, a well-known textile educator and author died on August 2nd, at St. Anne's-on-the-Sea, Lancashire, England. He was born in Blackburn, England in 1866. He was educated for the textile business, and in 1884 organized the textile department of the Blackburn Science and Technical Schools. From 1886 to 1895, he was superintendent and manager of several English cotton mills. During part of the time that he was superintendent, he was also examiner in cotton manufacturing in all English technical schools. Mr. Brooks then took up his residence in this country and was managing director of the Lowell Textile School of Lowell, Mass., which he had organized. In 1898 he resigned his position and went to New Bedford, Mass., where he took up the duties of organizing and equipping the New Bedford Textile School, of which he was the active director for several years. Mr. Brooks was well known as the director of the American Correspondence School of Textiles, which position he held for nine years, until the school was removed from New Bedford to Scranton, Pa.

He was a member of the Society of Arts, London; honor medalist City and Guilds of London Institute, London, 1887; a member of the board of government of National Association of Cotton Manufacturers, and a member of the International Congress of Technical Education.

He was author of "Cotton Manufacturing," "Weaving Calculations," "Cotton, Its uses, Varieties, Fiber Structure, and Cultivation," and the instruction papers of the International Correspondence Schools.

In June, 1907, Mr. Brooks was appointed a member of the Massachusetts State committee of the National Society for the promotion of Industrial Education.

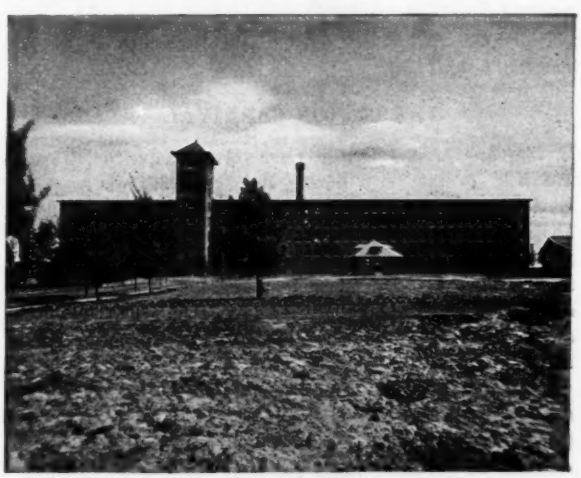
ELECTRICAL EQUIPMENT OF THE LORAY MILL.

(*Contributed exclusively to* COTTON.)

BY D. H. BRAYMER.

Electric transmission and motor drives used in connection with the textile industry have received considerable attention of late. On account of some of the peculiar features of this industry incident to the nature of the material handled, the working out of the practical application of motors for driving the different machines, is a matter of considerable interest. A number of Southern mills have already adopted electric power, and many others are contemplating changing their present source of power for electricity, owing to favorable conditions which will be explained later in this article.

One of the largest mills in the South which now uses electric power is the Loray mill, located at Gastonia, N. C. This mill was formerly driven by steam power and rope transmission in connection with line shafts. The Loray mill has 37 motors in operation with a total horsepower of approximately 3,000. These motors are all three-phase, 60-cycle, 2,200-volt Hawthorn induction motors made by the Western Electric Co. and are supplied with current from the Southern Power Co., Gastonia, N. C.



LORAY MILL, GASTONIA, N. C.

Much can be said at the present time in favor of electric transmission for the textile industry, especially in certain localities where the power is easily available. One of the principal reasons why the rope installation is being replaced by electric power is that the power needed in one department is independent of the power required in the other departments. In large plants, using rope transmission, complete shut-downs for repairs of ropes frequently happen and cause enforced idleness of the plant for from one to two days. Such a condition of affairs becomes a

serious problem, when orders have to be gotten out on time in order to meet the requirements of a contract. In these days it is necessary for the mill to make every provision

FIG. 1. MOTOR DRIVE IN SPINNING ROOM.

for continuous operation, and also to keep the amount of power consumed at the lowest possible figure so that the total cost of power per unit of power used will be correspondingly low.

It may be said that electric motors have come nearest to fulfilling these requirements, and with an electric installation, actual records of the power consumed can be made. The electrician standing at the switchboard in the engine room or at the distributing board, is able to tell at once when the amount of power required is increasing over that required for normal operations, by simply looking at his indicating or recording instrument. Furthermore, by inserting indicating meters in any motor circuit, checks can be made on each individual department's power consumption, and also on the power consumption of different machines, so that the power required for the different processes can be made a scientific study.

Heretofore, the powering of a rope-driven mill was more or less a matter of guesswork. The results obtained really depended to a large degree upon the experience and ability of the installing engineer in this work. With electric installations, the method of working out the complete motor equipment of a cotton mill can be solved on paper with considerable accuracy. The installing problem may be stated as follows: The superintendent or consulting engineer first selects the textile machinery for the mill and installs it in the plant according to a standard method of laying out a mill in order to obtain the greatest degree of economy of production. At this point that part of the work which rests upon experience ends. The engineer then takes up the problem and considers the power requirements for each machine individually.

Rotative power is the product of speed and torque; and work is the product of rotative power and time. Manufacturers of electrical machines now furnish upon request, performance curves for any of their motors with a guarantee, and will also solve individual problems and recommend sizes of motors to use. These results are easily checked by the engineer from the performance curves furnished and the operating conditions of the plant. After the installation has been made, many methods of reliable tests are available, which can be made from time to time at a small expense. The efficiency of each motor can therefore be ascertained, and a record kept of it by some method such as an efficiency time chart.

In order that an electric motor may give satisfaction and be most suitable as drives for industrial purposes, a knowledge of the operating characteristics of the motor is most important. The motors installed at the Loray Mill, as previously stated, are three-phase Hawthorn induction motors. The most important characteristic of an induction motor is that which shows the relation between torque and speed. When the load is put on a motor, its speed falls until the induced electromotive force in the secondary is sufficient to develop the torque required by the load. As the load increases, the torque increases, and the speed decreases until the pull out point is reached when the motor stops. The torque developed is directly proportional to the watts input to the secondary and varies as the square of the voltage impressed on the primary winding.

As a measure of an induction motor's efficiency, the ratio of the actual to the synchronous speed is often taken. There is, therefore, a considerable variation in the efficiency at different speeds for a given value of torque. An increased torque accompanies an increased secondary loss, so that it is impossible to have high efficiencies with large torque. However, in most cases, a constant speed is most desirable for textile mills and herein lies the success of this kind of motor. A constant speed induction motor with its

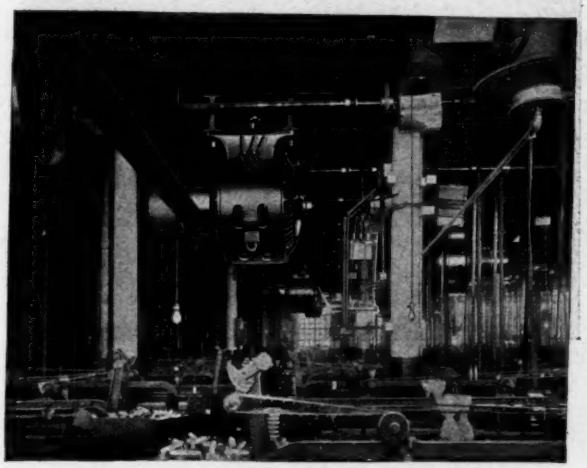


FIG. 2. MOTOR DRIVE IN WEAVE ROOM.

squirrel cage rotor has a very small slip and therefore high efficiency and very good speed regulation, running at nearly constant speed from no load to moderate overloads.

The size of the Loray mill makes it an excellent example of a motor-driven equipment, since approximately 58,000 spindles and 1,650 looms are driven by electrical power. Fig. 1 shows a view in the spinning room of this mill. There are installed in this section, 14 Hawthorn motors, of 75 horse-power each, suspended from the ceiling in a row extending down the center bay of the section. Each of these motors has two pulleys attached, from which two belts extend in opposite directions to counter shafts extending down each side of the bay at the end of the two

rows of spinning frames. The spinning frames are driven direct from these counter shafts. The shafting and method of operating by the former rope transmission equipment remained the same as originally installed. The change from rope to electric drive, therefore, occasioned a minimum of expense, which consisted principally of motor equipment, wiring, and changes in belting.

The method of drive and the two-pulley attachment are shown somewhat plainer in Fig. 2, which is a view in the weave room. The motors as shown are suspended from the ceiling and rigidly secured to beams which are in turn secured by steel belts to the ceiling beams. In the weave room, five motors of 125 horse-power each are installed, each operating two sections of looms in a similar manner to that used in the spinning room, as shown in Fig. 1.

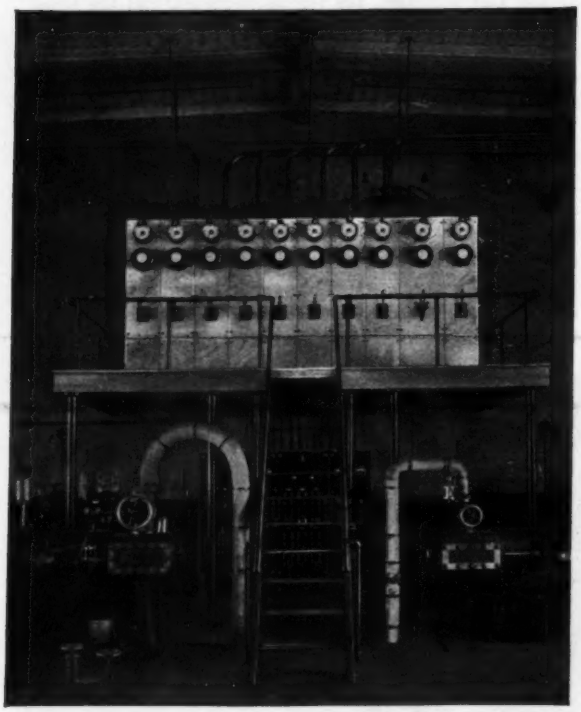


FIG. 3. SWITCHBOARD IN ENGINE ROOM.

Mounted on a column at the right of each of these motor installations are the starting and controlling devices. Each motor is equipped with an auto starter and line panel, the line panel being equipped with a three-pole single throw automatic oil switch.

The 10-panel switchboard used in connection with this motor installation is shown in Fig. 3. Each panel is equipped with the necessary indicating meters and an oil switch. Below this board is seen a steam engine connected to direct current generators. This equipment was formerly used to light the mill, but is now idle since both lights and motors are supplied with power from the Southern Power Co.'s circuits.

This installation is only one of many illustrations of the present day tendency toward the problem of economic powering of mills. Factory managers who are using steam power for their plants are now realizing that only about 66⅔ per cent. of the power generated is delivered to the machines actually doing the work, that is, one-third of all the power produced in a mechanically driven plant equipment under full load, is lost. This loss is practically constant regardless of the number of machines in operation. Actual tests have shown that the average load factor is about 50 per cent. in most steam-power plants. With direct connected motors of standard make, the efficiency varies very slightly with the load, and is as high as 85 per cent. at half or three-quarter load.

TEXTILE SCHEDULES IN THE PAYNE TARIFF ACT.

SCHEDULE I.—COTTON MANUFACTURES.

SCHEDULE K.—WOOL, AND MANUFACTURES OF THE SAME.

The Payne tariff act became effective on August 6, 1909. The duties on cotton manufactures are enumerated under Schedule I; and wool, and manufactures of the same, under Schedule K.

These two schedules are printed in full herewith, in order to provide a complete record for reference.

SCHEDULE I.—COTTON MANUFACTURES.

313. Cotton thread and carded yarn, warps or warp yarn, in singles, whether on beams or in bundles, skeins, or cops, or in any other form, except spool thread of cotton, crochet, darning, and embroidery cottons, hereinafter provided for, not colored, bleached, dyed or advanced beyond the condition of singles by grouping or twisting two or more single yarns together, two and one-half cents per pound on all numbers up to and including number fifteen, one-sixth of a cent per number per pound on all numbers exceeding number fifteen and up to and including number thirty, and one-fifth of a cent per number per pound on all numbers exceeding number thirty: Provided, That none of the foregoing shall pay a less rate of duty than fifteen per centum ad valorem; colored, bleached, dyed, combed, or advanced beyond the condition of singles by grouping or twisting two or more single yarns together, whether on beams, or in bundles, skeins, or cops, or in any other form, except spool thread of cotton, crochet, darning, and embroidery cottons, hereinafter provided for, six cents per pound on all numbers up to and including number twenty-four, and all numbers exceeding number twenty-four and up to number eighty, one-fourth of one cent per number per pound; on number eighty and up to number two hundred, three-tenths of one cent per number per pound; on number two hundred and above, sixty cents per pound, and one-tenth of one cent per number per pound additional for every number in excess of number two hundred; cable-laid yarns or threads, made by grouping or twisting two or more grouped or twisted yarns or threads together, not colored, bleached, or dyed, four-tenths of one cent per number per pound; colored, bleached, or dyed, nine-twentieths of one cent per number per pound: Provided further, That said threads and yarns, colored, bleached, dyed, combed advanced beyond the condition of singles, and cable-laid yarns or threads, as hereinbefore provided, except those (other than cable-laid threads and yarns) finer than number one hundred and forty, shall not pay a less rate of duty than twenty per centum ad valorem: And provided further, That all of the foregoing threads and yarns as hereinbefore provided, when mercerized or subjected to any similar process, shall pay in addition to the foregoing spe-

cific rates of duty one-fortieth of one cent per number per pound; cotton card laps, roping, sliver, or roving, thirty-five per centum ad valorem. Cotton waste and flocks, manufactured or otherwise advanced in value, twenty per centum ad valorem.

314. Spool thread of cotton, crochet, darning, and embroidery cottons, on spools, reels or balls, containing on each spool, reel or ball, not exceeding one hundred yards of thread, six cents per dozen; exceeding one hundred yards on each spool, reel or ball, for every additional hundred yards or fractional part thereof in excess of one hundred, six cents per dozen spools, reels or balls; if in skeins, cones or tubes, containing less than six hundred yards each, one-half of one cent for each one hundred yards or fractional part thereof: Provided, That in no case shall the duty be assessed upon a less number of yards than is marked on the spools, reels, cones, tubes, skeins, or balls: And provided further, That none of the foregoing shall pay a less rate of duty than twenty per centum ad valorem.

315. Cotton cloth, valued at not over seven cents per square yard, not bleached, dyed, colored, stained, painted, or printed, and not exceeding fifty threads to the square inch, counting the warp and filling, one cent per square yard; if bleached, and valued at not over nine cents per square yard, one and one-fourth cents per square yard; if dyed, colored, stained, painted, or printed, and valued at not over twelve cents per square yard, two cents per square yard; cotton cloth, not bleached, dyed, colored, stained, painted, or printed, exceeding fifty and not exceeding one hundred threads to the square inch counting the warp and filling, and valued at not over seven cents per square yard, not exceeding six square yards to the pound, one and one-fourth cents per square yard; exceeding six and not exceeding nine square yards to the pound, one and one-half cents per square yard; exceeding nine square yards to the pound, one and three-fourth cents per square yard; cotton cloth, not bleached, dyed, colored, stained, painted, or printed, not exceeding one hundred threads to the square inch, counting the warp and filling, and valued at over seven and not over nine cents per square yard, two and one-fourth cents per square yard; valued at over nine and not over ten cents per square yard, two and three-fourth cents per square yard; valued at over ten and not over twelve and one-half cents per square yard, four cents per square yard; valued at over twelve and one-half cents and not over fourteen cents per square yard, five cents per square yard; valued at over fourteen cents per square yard, six cents per square yard, but not less than twenty-five per centum ad valorem; cotton cloth, exceeding fifty and not exceeding one hundred threads to the square inch, counting the warp and filling, if bleached, and valued at not over nine cents per square yard, and not exceeding six square yards to the pound, one and one-half cents per square yard; exceeding six and not exceeding nine square yards to the pound, one and three-fourths cents per square yard; exceeding nine square yards to the pound, two and one-fourth cents per square yard; cotton cloth, not exceeding one hundred threads to the square inch, counting the warp and filling, if bleached, and valued at over nine and not over eleven cents per square yard, two and three-fourths cents per square yard; valued at over eleven and not over twelve cents per square yard, four cents per square yard; valued at over twelve and not over fifteen cents per square yard, five cents per square yard; valued at over fifteen and not over sixteen cents per square yard, six cents per square yard; valued at over sixteen cents per square yard, seven cents per square yard, but not less than twenty-five per centum ad valorem; cotton cloth, exceeding fifty and not exceeding one hundred threads to the square inch, counting the warp and filling, if dyed, colored, stained, painted, or printed, and valued at not over twelve cents per square yard, not exceeding six square yards to the pound, two and three-fourths cents per square yard; exceeding six and not exceeding nine square yards to the pound, three and one-fourth cents per square yard; exceeding nine square yards to the pound, three and one-half cents per square yard; cotton cloth, not exceeding one hundred threads to the square inch, counting the warp and filling, if dyed, colored, stained, painted, or printed, and valued at over twelve and not over twelve and one-half half cents per square yard, three and three-fourths cents per square yard; valued at over twelve and one-half and not over fifteen cents per square yard, five cents per square yard; valued at over fifteen and not over seventeen and one-half cents per square yard, six and one-half cents per square yard; valued at over seventeen and one-half and not over twenty cents per square yard, seven and one-half cents per square yard; valued at over twenty cents per square yard; nine cents per square yard, but not less than thirty per centum ad valorem.

316. Cotton cloth, not bleached, dyed, colored, stained, painted, or printed, exceeding one hundred and not exceeding one hundred and fifty threads to the square inch, counting the warp and filling, and not exceeding four square yards to the pound, one and one-half cents per square yard; exceeding four and not exceeding six square yards to the pound, two cents per square yard; exceeding six and not exceeding eight square yards to the pound, two and one-half cents per square yard; exceeding eight square yards to the pound, two and three-fourths cents per square yard; any of the foregoing at over nine and not over ten cents per square yard, three cents per square yard; valued at over ten cents, but not over twelve and one-half cents per square yard, four and three-eights cents per square yard; valued at over twelve and one-half and not over fourteen cents per square yard, five and one-half cents per square yard; valued at over fourteen and not over sixteen cents per square yard, six and one-half cents per square yard; valued at over sixteen cents per square yard, eight cents per square yard, but not less than thirty per centum ad valorem; if bleached, and not exceeding four square yards to the pound, two and one-half cents per square yard; exceeding four and not exceeding six square yards to the pound, three cents per square yard; exceeding six and not exceeding eight square yards to the pound, three and one-half cents per square yard; exceeding eight square yards to the pound, three and three-fourths cents per square yard; any of the foregoing, bleached, and value at over eleven and not over twelve cents per square yard; four and one-quarter cents per square yard; valued at over twelve and not over fifteen cents per square yard, five and one-fourth cents per square yard; valued at over fifteen and not over sixteen cents per square yard, six and one-half cents per square yard; valued at over sixteen and not over twenty cents per square yard, eight cents per square yard; valued at over twenty cents per square yard, ten cents per square yard, but not less than thirty-five per centum ad valorem; if dyed, colored, stained, painted, or printed, and not exceeding four square yards

to the pound, three and one-half cents per square yard; exceeding four and not exceeding six square yards to the pound, three and three-fourths cents per square yard; exceeding six and not exceeding eight square yards to the pound, four and one-fourth cents per square yard; exceeding eight square yards to the pound, four and one-half cents per square yard; any of the foregoing, dyed, colored, stained, painted, or printed, and valued at over twelve and one-half, but not over fifteen cents per square yard, five and one-fourth cents per square yard; valued at over fifteen and not over seventeen and one-half cents per square yard, seven cents per square yard; valued at over seventeen and one-half, but not over twenty cents per square yard, eight cents per square yard; valued at over twenty cents per square yard, ten cents per square yard, but not less than thirty-five per centum ad valorem.

317. Cotton cloth, not bleached, dyed, colored, stained, painted, or printed, exceeding one hundred and fifty and not exceeding two hundred threads to the square inch, counting the warp and filling, and not exceeding three and one-half square yards to the pound, two cents per square yard; exceeding three and one-half and not exceeding four and one-half square yards to the pound, two and three-fourths cents per square yard; exceeding four and one-half and not exceeding six square yards to the pound, three cents per square yard; exceeding six square yards to the pound, three and one-half cents per square yard; any of the foregoing valued at over ten and not over twelve and one-half cents per square yard, four and three-eights cents per square yard; valued at over twelve and one-half and not over fourteen cents per square yard, five and one-half cents per square yard; valued at over fourteen and not over sixteen cents per square yard, six and one-half cents per square yard; valued at over sixteen and not over twenty cents per square yard, eight cents per square yard; valued at over twenty cents per square yard, ten cents per square yard, but not less than thirty-five per centum ad valorem; if bleached, and not exceeding three and one-half square yards to the pound, two and three-fourth cents per square yard; exceeding three and one-half and not exceeding four and one-half square yards to the pound, three and one-half cents per square yard; exceeding four and one-half and not exceeding six square yards to the pound, four cents per square yard; exceeding six square yards to the pound, four and one-fourth cents per square yard; any of the foregoing, bleached, and valued at over twelve and not over fifteen cents per square yard, five and one-fourth cents per square yard; valued at over fifteen and not over sixteen cents per square yard, six and one-half cents per square yard; valued at over sixteen and not over twenty cents per square yard, eight cents per square yard; valued at over twenty cents per square yard, ten cents per square yard, but not less than thirty-five per centum ad valorem; if dyed, colored, stained, painted, or printed, and not exceeding three and one-half square yards to the pound, four and one-fourth cents per square yard; exceeding three and one-half and not exceeding four and one-half square yards to the pound, four and one-half cents per square yard; exceeding four and one-half and not exceeding six square yards to the pound, four and three-fourths cents per square yard; exceeding six square yards to the pound, five cents per square yard; any of the foregoing, dyed, colored, stained, painted, or printed, and valued at over twelve and one-half and not over fifteen cents per square yard, six cents per square yard; valued at over fifteen and not over seventeen and one-half cents per square yard, seven cents per square yard; valued at over seventeen and one-half and not over twenty cents per square yard, eight cents per square yard; valued at over twenty cents per square yard, ten cents per square yard, but not less than forty per centum ad valorem.

318. Cotton cloth, not bleached, dyed, colored, stained, painted, or printed, exceeding two hundred and not exceeding three hundred threads to the square inch, counting the warp and filling, and not exceeding two and one-half square yards to the pound, three and one-half cents per square yard; exceeding two and one-half and not exceeding three and one-half square yards to the pound, four cents per square yard; exceeding three and one-half and not exceeding five square yards to the pound, four and one-half cents per square yard; exceeding five square yards to the pound, five cents per square yard; any of the foregoing, valued at over twelve and one-half and not over fourteen cents per square yard, five and one-half cents per square yard; valued at over fourteen and not over sixteen cents per square yard, six and one-half cents per square yard; valued at over sixteen and not over twenty cents per square yard, eight cents per square yard; valued at over twenty cents per square yard, ten cents per square yard, but not less than forty per centum ad valorem; if bleached, and not exceeding two and one-half square yards to the pound, four and one-half cents per square yard; exceeding two and one-half and not exceeding three and one-half square yards to the pound, five cents per square yard; exceeding three and one-half and not exceeding five square yards to the pound, five and one-half cents per square yard; exceeding five square yards to the pound, six cents per square yard; any of the foregoing, bleached, and valued at over fifteen and not over sixteen cents per square yard, six and one-half cents per square yard; valued at over sixteen and not over twenty cents per square yard, eight cents per square yard; valued at over twenty and not over twenty-five cents per square yard, eleven and one-fourth cents per square yard; valued at over twenty-five cents per square yard, twelve and one-half cents per square yard, but not less than forty per centum ad valorem; if dyed, colored, stained, painted, or printed, and not exceeding three and one-half square yards to the pound, six and one-fourth cents per square yard; exceeding three and one-half square yards to the pound, seven cents per square yard; any of the foregoing, dyed, colored, stained, painted, or printed, and valued at over seventeen and one-half and not over twenty cents per square yard, eight cents per square yard; valued at over twenty and not over twenty-five cents per square yard, eleven and one-fourth cents per square yard; valued at over twenty-five cents per square yard, twelve and one-half cents per square yard, but not less than forty per centum ad valorem.

319. Cotton cloth not bleached, dyed, colored, stained, painted, or printed, exceeding three hundred threads to the square inch, counting the warp and filling, and not exceeding two square yards to the pound, four cents per square yard; exceeding two and not exceeding three square yards to the pound, four and one-half cents per square yard; exceeding three and not exceeding four square yards to the pound, five cents per square yard; exceeding four square yards to the pound, five and one-half cents per square yard; any of the foregoing valued at over fourteen and not over sixteen cents per square yard, six and one-half cents per

square yard; valued at over sixteen and not over twenty cents per square yard, eight cents per square yard; valued at over twenty and not over twenty-five cents per square yard, eleven and one-fourth cents per square yard; valued at over twenty-five cents per square yard, twelve and one-half cents per square yard, but not less than forty per centum ad valorem; if bleached and not exceeding two square yards to the pound, five cents per square yard; exceeding two and not exceeding three square yards to the pound, five and one-half cents per square yard; exceeding three and not exceeding four square yards to the pound, six cents per square yard; exceeding four square yards to the pound, six and one-half cents per square yard; any of the foregoing bleached, and valued at over sixteen and not over twenty cents per square yard, eight cents per square yard; valued at over twenty and not over twenty-five cents per square yard, eleven and one-fourth cents per square yard; valued at over twenty-five cents per square yard, twelve and one-half cents per square yard, but not less than forty per centum ad valorem; if dyed, colored, stained, painted, or printed, and not exceeding three square yards to the pound, six and one-half cents per square yard; exceeding three square yards to the pound, eight cents per square yard; any of the foregoing dyed, colored, stained, painted, or printed, and valued at over twenty and not over twenty-five cents per square yard, eleven and one-fourth cents per square yard; valued at over twenty-five cents per square yard, twelve and one-half cents per square yard, but not less than forty per centum ad valorem.

320. The term cotton cloth, or cloth, wherever used in the paragraphs of this schedule, unless otherwise specially provided for, shall be held to include all woven fabrics of cotton in the piece, or cut in lengths, whether figured, fancy, or plain, the warp and filling threads of which can be counted by unraveling or other practicable means, and shall not include any article, finished or unfinished, made from cotton cloth. In determining the count of threads to the square inch in cotton cloth, all the warp and filling threads, whether ordinary or other than ordinary, and whether clipped or unclipped, shall be counted. In the ascertainment of the weight and value, upon which the duties, cumulative or other, imposed upon cotton cloth are made to depend, the entire fabric and all parts thereof, and all the threads of which it is composed shall be included. The terms bleached, dyed, colored, stained, mercerized, painted, or printed, wherever applied to cotton cloth in this schedule, shall be taken to mean, respectively, all cotton cloth which either wholly or in part has been subjected to any of these processes, or which has any bleached, dyed, colored, stained, mercerized, painted, or printed threads in or upon any part of the fabric.

321. Cloth, composed of cotton or other vegetable fiber and silk, whether known as silk-stripe sleeve linings, silk stripes, or otherwise, of which cotton or other vegetable fiber is the component material of chief value, eight cents per square yard and thirty per centum ad valorem: Provided, That no such cloth shall pay a less rate of duty than fifty per centum ad valorem. Cotton cloth filled or coated, all oilcloths (except silk oilcloth and oilcloths for floors), and cotton window Hollands, three cents per square yard and twenty per centum ad valorem; tracing cloth, five cents per square yard and twenty per centum ad valorem.

322. Handkerchiefs or mufflers composed of cotton, whether in the piece or otherwise, and whether finished or unfinished, if not hemmed, or hemmed only, shall pay the same rate of duty on the cloth contained therein as is imposed on cotton cloth of the same description, weight and count of threads to the square inch; but such handkerchiefs or mufflers shall not pay a less rate of duty than forty-five per centum ad valorem. If such handkerchiefs or mufflers are hemstitched, or imitation hemstitched, or revered, or have drawn threads, they shall pay a duty of ten per centum ad valorem in addition to the duty hereinbefore prescribed, and in no case less than fifty-five per centum ad valorem; if such handkerchiefs or mufflers are embroidered in any manner, whether with an initial letter, monogram, or otherwise, by hand or machinery, or are tamboured, appliquéed, or trimmed wholly or in part with lace or with tucking or insertion, they shall not pay a less rate of duty than sixty per centum ad valorem.

323. In addition to the duty or duties imposed upon cotton cloth by the various provisions of this section, there shall be paid the following cumulative duties, the intent of this paragraph being to add such duty or duties to those to which the cotton cloth would be liable if the provisions of this paragraph did not exist, namely: On all cotton cloth in which other than the ordinary warp and filling threads are used to form a figure or fancy effect, whether known as lappets or otherwise, one cent per square yard, if valued at not more than seven cents per square yard, and two cents per square yard if valued at more than seven cents per square yard; on all cotton cloth mercerized or subjected to any similar process, one cent per square yard.

324. Clothing, ready-made, and articles of wearing apparel of every description, composed of cotton or other vegetable fiber, or of which cotton or other vegetable fiber is the component material of chief value, made up or manufactured, wholly or in part, by the tailor, seamstress, or manufacturer, and not otherwise provided for in this section, fifty per centum ad valorem.

325. Plushes, velvets, velveteens, corduroys, and all pile fabrics, cut or uncut, whether or not the pile covers the entire surface; any of the foregoing composed of cotton or other vegetable fiber, except flax, not bleached, dyed, colored, stained, painted, or printed, nine cents per square yard and twenty-five per centum ad valorem; if bleached, dyed, colored, stained, painted, or printed, twelve cents per square yard and twenty-five per centum ad valorem: Provided, That corduroys composed of cotton or other vegetable fiber, weighing seven ounces or over per square yard, shall pay a duty of eighteen cents per square yard and twenty-five per centum ad valorem: Provided further, That manufacturers or articles in any form including such as are commonly known as bias dress facings or skirt bindings, made or cut from plushes, velvets, velveteens, corduroys, or other pile fabrics composed of cotton or other vegetable fiber, shall be subject to the foregoing rates of duty, and in addition thereto ten per centum ad valorem: Provided further, That none of the articles or fabrics provided for in this paragraph shall pay a less rate of duty than forty-seven and one-half per centum ad valorem.

326. Curtains, tablecovers and all articles manufactured of cotton chenille, or of which cotton chenille is the component material of chief value, tapestries and other Jacquard figured upholstery goods, weighing over six ounces per square yard, composed wholly or in chief value of cotton or other vegetable fiber; any of the foregoing, in the piece or otherwise, fifty per centum ad valorem.

327. Stockings, hose and half-hose, made on knitting machines or frames, composed of cotton or other vegetable fiber, and not otherwise specially provided for in this section, thirty per centum ad valorem.

328. Stockings, hose and half-hose, selvedged, fashtoned, narrowed, or shaped wholly or in part by knitting machines or frames or knit by hand, including such as are commercially known as seamless stockings, hose and half-hose, and clocked stockings, hose and half-hose, all of the above composed of cotton or other vegetable fiber, finished or unfinished, valued at not more than one dollar per dozen pairs, seventy cents per dozen pairs; valued at more than one dollar per dozen pairs, and not more than one dollar and fifty cents per dozen pairs, eighty-five cents per dozen pairs; valued at more than one dollar and fifty cents per dozen pairs, and not more than two dollars per dozen pairs, ninety cents per dozen pairs; valued at more than two dollars per dozen pairs, and not more than three dollars per dozen pairs, one dollar and twenty cents per dozen pairs; valued at more than three dollars per dozen pairs, and not more than five dollars per dozen pairs, two dollars per dozen pairs; and in addition thereto, upon all the foregoing, fifteen per centum ad valorem; valued at more than five dollars per dozen pairs, fifty-five per centum ad valorem. Men's and boys' cotton gloves, knitted or woven, valued at not more than six dollars per dozen pairs, fifty cents per dozen pairs and forty per centum ad valorem; valued at more than six dollars per dozen pairs, fifty per centum ad valorem.

329. Shirts and drawers, pants, vests, union suits, combination suits, tights, sweaters, corset covers and all underwear of every description made wholly or in part on knitting machines or frames, or knit by hand, finished or unfinished, not including stockings, hose and half-hose, composed of cotton or other vegetable fiber, valued at not more than one dollar and fifty cents per dozen, sixty cents per dozen and fifteen per centum ad valorem; valued at more than one dollar and fifty cents per dozen and not more than threee dollars per dozen, one dollar and ten cents per dozen, and in addition thereto fifteen per centum ad valorem; valued at more than three dollars per dozen and not more than five dollars per dozen, one dollar and fifty cents per dozen, and in addition thereto twenty-five per centum ad valorem; valued at more than five dollars per dozen and not more than seven dollars per dozen, one dollar and seventy-five cents per dozen, and in addition thereto thirty-five per centum ad valorem; valued at more than seven dollars per dozen and not more than fifteen dollars per dozen, two dollars and twenty-five cents per dozen, and in addition thereto thirty-five per centum ad valorem; valued above fifteen dollars per dozen, fifty per centum ad valorem.

330. Bone casings, garters, tire fabric or fabric suitable for use in pneumatic tires, suspenders and braces, and tubing, any of the foregoing articles made of cotton or other vegetable fiber, and india rubber, or of which cotton or other vegetable fiber is the component material of chief value, and not embroidered by hand or machinery, forty-five per centum ad valorem; spindle banding, woven, braided or twisted lamp, stove, or candle wicking made of cotton or other vegetable fiber, ten cents per pound and fifteen per centum ad valorem; loom harness, healds or collets made of cotton or other vegetable fiber, or of which cotton or other vegetable fiber is the component material of chief value, fifty cents per pound and twenty-five per centum ad valorem; boot, shoe, and corset lacings made of cotton or other vegetable fiber, twenty-five cents per pound and fifteen per centum ad valorem; labels, for garments or other articles, composed of cotton or other vegetable fiber, fifty cents per pound and thirty per centum ad valorem; belting for machinery made of cotton or other vegetable fiber and india rubber, or of which cotton or other vegetable fiber is the component material of chief value, thirty per centum ad valorem.

331. Cotton table damask, forty per centum ad valorem; manufactures of cotton table damask or of which cotton table damask is the component material of chief value, and not specially provided for in this section, forty per centum ad valorem.

332. All articles made from cotton cloth, whether finished or unfinished, and all manufactures of cotton, or of which cotton is the component material of chief value, not specially provided for in this section, forty-five per centum ad valorem.

SCHEDULE K.—WOOL, AND MANUFACTURES OF THE SAME.

360. All wools, hair of the camel, goat, alpaca, and other like animals shall be divided for the purpose of fixing the duties to be charged thereon, shall be divided into the three following classes:

361. Class one, that is to say, merino, mestiza, metz, or metis wools, or other wools of Merino blood, immediate or remote, Down clothing wools and wools of like character with any of the preceding, including Bagdad wool, China lamb's wool, Castel Branco, Adrianople skin wool or butcher's wool, and such as have been heretofore usually imported into the United States from Buenos Ayres, New Zealand, Australia, Cape of Good Hope, Russia, Great Britain, Canada, Egypt, Morocco, and elsewhere, and all wools not hereinafter included in classes two and three.

362. Class two, that is to say, Leicester, Cotswold, Lincolnshire, Down combing wools, Canada long wools, or other like combing wools of English blood, and usually known by the terms herein used, and also hair of the camel, Angora goat, alpaca, and other like animals.

363. Class three, that is to say, Donskoi, native South American, Cordova, Valparaiso, native Symrna, Russian camel's hair, and all such wools of like character as have been heretofore usually imported into the United States from Turkey, Greece, Syria, and elsewhere, excepting improved wools hereinafter provided for.

364. The standard samples of all wools which are now or may be hereafter deposited in the principal custom houses of the United States, under the authority of the Secretary of the Treasury, shall be the standards for the classification of wools under this Act, and the Secretary of the Treasury is authorized to renew these standards and to make such additions to them from time to time as may be required, and he shall cause to be deposited like standards in other custom houses of the United States when they may be needed.

365. Whenever wools of class three shall have been improved by the admixture of Merino or English blood, from their present character as represented by the standard samples now or hereafter to be deposited in the principal custom houses of the United States, such improved wools shall be classified for duty either as class one or as class two, as the case may be.

366. The duty on wools of the first class which shall be imported washed shall be twice the amount of the duty to which they would be subjected if imported unwashed; and the duty on wools of the first and second classes which shall be imported scoured shall be three times the duty to which they would be subjected if imported unwashed. The duty on wools of the third class, if imported in condition for use in carding or spinning into yarns, or which shall not contain more than eight per centum of dirt or other foreign substance, shall be three times the duty to which they would otherwise be subjected.

367. Unwashed wools shall be considered such as shall have been shorn from the sheep without any cleansing; that is, in their natural condition. Washed wools shall be considered such as have been washed with water only on the sheep's back, or on the skin. Wools of the first and second classes washed in any other manner than on the sheep's back or on the skin shall be considered as scoured wool.

368. The duty upon wool of the sheep or hair of the camel, Angora goat, alpaca, and other like animals, of class one and class two, which shall be imported in any other than ordinary condition, or which has been sorted or increased in value by the rejection of any part of the original fleece, shall be twice the duty to which it would be otherwise subject: Provided, That skirted wools as imported in eighteen hundred and ninety and prior thereto are hereby excepted. The duty upon wool of the sheep or hair of the camel, Angora goat, alpaca, and other like animals of any class which shall be changed in its character or condition for the purpose of evading the duty, or which shall be reduced in value by the admixture of dirt or any other foreign substance, shall be twice the duty to which it would be otherwise subject. When the duty assessed upon any wool equals three times or more that which would be assessed if said wool was imported unwashed, the duty shall not be doubled on account of the wool being sorted. If any bale or package of wool or hair specified in this Act invoiced or entered as of any specified class, or claimed by the importer to be dutiable as of any specified class, shall contain any wool or hair subject to a higher rate of duty than the class so specified, the whole bale or package shall be subject to the highest rate of duty chargeable on wool of the class subject to such higher rate of duty, and if any bale or package be claimed by the importer to be shoddy, mungo, flocks, waste, hair, or other material of any class specified in this Act, and such bale contain any admixture of any one or more of said materials, or any other material, the whole bale or package shall be subject to duty at the highest rate imposed upon any article in said bale or package.

369. The duty upon all wools and hair of the first class shall be eleven cents per pound, and upon all wools or hair of the second class twelve cents per pound.

370. On wools of the third class and on camel's hair of the third class the value whereof shall be twelve cents or less per pound, the duty shall be four cents per pound. On wools of the third class, and on camel's hair of the third class, the value whereof shall exceed twelve cents per pound, the duty shall be seven cents per pound.

371. The duty on wools on the skin shall be one cent less per pound than is imposed in this schedule on other wools of the same class and condition, the quantity and value to be ascertained under such rules as the Secretary of the Treasury may prescribe.

372. Top waste, slubbing waste, roving waste, ring waste, and garnetted waste, thirty cents per pound.

373. Shoddy, twenty-five cents per pound; noils, wool extract, yarn waste, thread waste, and all other wastes composed wholly or in part of wool, and not specially provided for in this section, twenty cents per pound.

374. Woolen rags, mungo, and flocks, ten cents per pound.

375. On combed wool or tops, made wholly or in part of wool or camel's hair, valued at not more than twenty cents per pound, the duty per pound shall be two and one-fourth times the duty imposed by this schedule on one pound of unwashed wool of the first class; valued at more than twenty cents per pound, the duty per pound shall be three and one-third times the duty imposed by this schedule on one pound of unwashed wool of the first class; and in addition thereto, upon all of the foregoing, thirty per centum ad valorem.

376. Wool and hair which have been advanced in any manner or by any process of manufacture beyond the washed or scoured condition, not specially provided for in this section, shall be subject to the same duties as are imposed upon manufactures of wool not specially provided for in this section.

377. On yarns made wholly or in part of wool, valued at not more than thirty cents per pound, the duty per pound shall be two and one-half times the duty imposed by this section on one pound of unwashed wool of the first class, and in addition thereto thirty-five per centum ad valorem; valued at more than thirty cents per pound, the duty per pound shall be three and one-half times the duty imposed by this section on one pound of unwashed wool of the first class, and in addition thereto forty per centum ad valorem.

378. On cloths, knit fabrics, and all manufactures of every description made wholly or in part of wool, not specially provided for in this section, valued at not more than forty cents per pound, the duty per pound shall be three times the duty imposed by this section on a pound of unwashed wool of the first class; valued at above forty cents per pound and not above seventy cents per pound, the duty per pound shall be four times the duty imposed by this section on one pound of unwashed wool of the first class, and in addition thereto, upon all the foregoing, fifty per centum ad valorem; valued at over seventy cents per pound, the duty per pound shall be four times the duty imposed by this section on one pound of unwashed wool of the first class and fifty-five per centum ad valorem.

379. On blankets, and flannels for underwear composed wholly or in part of wool, valued at not more than forty cents per pound, the duty per pound shall be the same as the duty imposed by this section on two pounds of unwashed wool of the first class, and in addition thereto thirty per centum ad valorem; valued at more than forty cents and not more than fifty cents per pound, the duty per pound shall be three times the duty imposed by this section on one pound, and in addition thereto thirty-five per centum ad valorem. On blankets composed wholly or in part of wool, valued at more than fifty cents per pound, the duty per pound shall be three times the duty imposed by this section on one pound of unwashed wool of the first class, and in addition thereto forty per centum ad valorem. Flan-

nels composed wholly or in part of wool, valued at above fifty cents per pound, shall be classified and pay the same duty as women's and children's dress goods, coat linings, Italian cloths, and goods of similar character and description provided by this section: Provided, That on blankets over three yards in length the same duties shall be paid as on cloths.

380. On women's and children's dress goods, coat linings, Italian cloths, and goods of similar description and character of which the warp consists wholly of cotton or other vegetable material with the remainder of the fabric composed wholly or in part of wool, valued at not exceeding fifteen cents per square yard, the duty shall be seven cents per square yard; valued at more than fifteen cents per square yard, the duty shall be eight cents per square yard; and in addition thereto on all the foregoing valued at not above seventy cents per pound, fifty per centum ad valorem; valued above seventy cents per pound, fifty-five per centum ad valorem: Provided, That on all the foregoing, weighing over four ounces per square yard, the rates of duty shall be five per centum less than those imposed by this schedule on cloths.

381. On women's and children's dress goods, coat linings, Italian cloths, bunting and goods of similar description or character composed wholly or in part of wool, and not especially provided for in this section, the duty shall be eleven cents per square yard; and in addition thereto on all the foregoing valued at not above seventy cents per pound, fifty per centum ad valorem; valued above seventy cents per pound, fifty-five per centum ad valorem: Provided, That on all the foregoing, weighing over four ounces per square yard, the duty shall be the same as imposed by this schedule on cloths.

382. On clothing, ready-made, and articles of wearing apparel of every description, including shawls, whether knitted or woven, and knitted articles of every description, made up or manufactured, wholly or in part, felts not woven, and not specially provided for in this section, composed wholly or in part of wool, the duty per pound shall be four times the duty imposed by this section on one pound of unwashed wool of the first class, and in addition thereto sixty per centum ad valorem.

383. Webbings, gorings, suspenders, braces, bandings, beltings, bindings, braids, galloons, edgings, insertings, flouncings, fringes, gimps, cords, cords and tassels, ribbons, ornaments, laces, trimmings, and articles made wholly or in part of lace, embroideries and all articles embroidered by hand or machinery, head nets, nettings, buttons or barrel buttons or buttons or other forms for tassels or ornaments, and manufactures of wool ornamented with beads or spangles of whatever material composed, any of the foregoing made of wool or of which wool is a component material, whether containing india rubber or not, fifty cents per pound and sixty per centum ad valorem.

384. Aubusson, Axminster, moquette, and chenille carpets, figured or plain, and all carpets or carpeting of like character or description, sixty cents per square yard, and in addition thereto forty per centum ad valorem.

385. Saxony, Wilton, and Tournay velvet carpets, figured or plain, and all carpets or carpeting of like character or description, sixty cents per square yard, and in addition thereto forty per centum ad valorem.

386. Brussels carpets, figured or plain, and all carpets or carpeting of like character or description, forty-four cents per square yard and in addition thereto forty per centum ad valorem.

387. Velvet and tapestry velvet carpets, figured or plain, printed on the warp or otherwise, and all carpets or carpeting of like character or description, forty cents per square yard, and in addition thereto forty per centum ad valorem.

388. Tapestry Brussels carpets, figured or plain, and all carpets or carpeting of like character or description, printed on the warp or otherwise, twenty-eight cents per square yard, and in addition thereto forty per centum ad valorem.

389. Treble ingrain, three-ply, and all chain Venetian carpets, twenty-two cents per square yard, and in addition thereto forty per centum ad valorem.

390. Wool Dutch and two-ply ingrain carpets, eighteen cents per square yard, and in addition thereto forty per centum ad valorem.

391. Carpets of every description, woven whole for rooms, and Oriental, Berlin, Aubusson, Axminster, and similar rugs, ten cents per square foot and forty per centum ad valorem: Provided, That in the measurement of all mats, rugs, carpets and similar articles, of whatever material composed, the selvage, if any, shall be included.

392. Druggets and bockings, printed, colored or otherwise, twenty-two cents per square yard and in addition thereto forty per centum ad valorem.

393. Carpets and carpeting of wool, flax or cotton, or composed in part of any of them, not specially provided for in this section, and mats, matting and rugs of cotton, fifty per centum ad valorem.

394. Mats, rugs for floors, screens, covers, hassocks, bed sides, art squares, and other portions of carpets or carpeting made wholly or in part of wool, and not specially provided for in this section, shall be subjected to the rate of duty herein imposed on carpets or carpetings of like character or description.

395. Whenever, in any schedule of this Act, the word "wool" is used in connection with a manufactured article of which it is a component material, it shall be held to include wool or hair of the sheep, camel, goat, alpaca, or other animal, whether manufactured by the woolen, worsted, felt, or any other process.

FABRICS FROM INDIA.

India cloth is made on scientific principles and will prove a boon to farmers and all others whose work compels them to be exposed to the direct rays of the sun. It is well understood that sunstrokes, or collapses from the effects of the actinic rays of the sun, may be warded off by wearing clothes made of cloth that conforms to the plan of nature, as exemplified in the color of the skin and the pigment under the skin of peoples who inhabit the Tropics.

Thatcho and shikari cloth are coming into very popular use in India, especially with white people who are exposed to the direct rays of the sun, either while hunting, engaged in sports, or in the transaction of business. The cloth is really attractive and possesses good wearing qualities. The retail price of woolen thatcho in Calcutta is $2 per yard, double width, and of cotton thatcho 66 cents per yard, single width; the retail price of green shikari is 33 cents per yard, single width.—CONSULAR REPORT.

COTTON MANUFACTURING

DESIGNING AND CLOTH ANALYSIS.

DEFINITION OF DESIGNING AND CLOTH ANALYSIS. DUTIES OF A DESIGNER. MAKING SAMPLE BLANKETS, ETC. USE OF DESIGN PAPER. PLAIN AND TWILL WEAVES EXPLAINED.

(*Contributed exclusively to* COTTON.)

BY CHARLES E. BARNHARDT.

PART I.

EDITOR'S NOTE.—This series of articles on "Designing and Cloth Analysis" has been prepared for the specific purpose of interesting and instructing our readers in the fundamental principles of cloth designing and analysis. The subject will be dealt with in an elementary manner, along the same line pursued in the best textile schools of the country.

The greatest benefit will be derived from these articles if those who desire to learn cloth designing will practice making the designs on paper from the first article in the series. In order to facilitate this practice among our readers who are interested in the work, this publication will furnish the necessary designing paper, paint, and brush, properly trimmed, at actual cost, amounting to about 45 cents. Single large sheets of designing paper will be furnished at 10 cents per sheet.

Designing and cloth analysis are very closely allied to each other. The latter is the art of being able to take a small piece of cloth and from it reproduce the identical weave or figure and construction, in the loom. To a person familiar with the working of a dobby loom, the operation of analyzing a piece of cloth in order to reproduce it, is a very simple matter, and in this series of articles it is my endeavor to present the principles of designing and cloth analysis in such a manner that it will be readily understood by any person with a fair knowledge of the workings of a loom.

In reproducing a sample of cloth, it is necessary that the construction of the cloth be first known, that is, we must ascertain the width, pick, and yards per pound; also the number of the yarn used for the warp and the number of that used for the filling. Then we must pick out the interlacings of the threads in the sample,in order to get the design on the design or point paper, from which the drawing-in draft and harness draft or pegging plan are made, all of which will be fully explained later on in this article.

DESIGNING DEFINED.

Designing may be said to be the art of producing new weaves and new effects. While new effects are constantly being produced, if the design is closely studied, it will be seen that in almost all instances the design is the result of some combination or alteration of weaves which have been used for years and years. In this connection, it must be understood that there are certain foundation weaves, such as twills, satins, etc., which, when variously combined and modified or used with different colorings, will produce effects which to the average person will appear to be something entirely new, when it is simply a repetition of the same old weaves, which are combined differently or used in connection with different color effects.

The general ideas of the trade in reference to designs and colors are constantly changing. Sometimes the large effects and bright colors are mostly in demand, while in some seasons, small effects and different solors are more popular. Some of the patterns which are at this time considered to be the very best of style, would have appeared very much out of date two or three years ago, while perhaps in a few years more, the patterns which are at this time almost obsolete, will, with some changes, become the most popular sellers of the season.

DUTIES OF A DESIGNER.

The duties of a designer in a mill are usually that of getting out the patterns or line of samples from suggestions furnished him by the mill's commission house or selling agent. As the designer is usually confined to the mill all the time and does not get out among the trade, he is therefore not in a position to judge what lines or patterns would be most likely to appeal to the trade and prove to be good sellers. Again the designer in the mill is sometimes furnished with a general idea of the character of the construction and designs for a line of goods to be sold at a certain price, and from this information he gets out samples of what he thinks will take well with the trade.

But as a rule the selling agents supply the designing department of the mill with all the samples, information, and suggestions necessary in getting out its samples, and therefore the designer is only responsible for carrying out his instructions as nearly perfect as possible, and if the line does not take well with the trade, it is not his fault. The man in the commission house, who gets up the information for the mill in reference to what shall be made, is often called the "styler," and the man is usually the manager of some department or a member of the firm.

The selling agents have arrangements through which they receive all the latest foreign samples and fashion papers, while some of them have special correspondents abroad, who are constantly on the lookout, and report anything new in the way of fabric, design or color which they think will make a hit with the trade. Some agents will send their representatives to Europe each season to ascertain what goods are taking well over there and get new ideas for goods for the mills that they represent. Quite frequently a new idea for a fabric is conceived, which when worked up will prove to sell well and show a nice profit to the mill. Very often a mill will have a line of novelty dress goods which will sell well and show a handsome profit for one season and the next season, it may be impossible to sell the same line at more than cost of manufacture. The tastes of the public in regard to dress are constantly changing and the designer or styler who can constantly produce patterns to suit the requirements of the people is a very valuable man to any concern.

The samples furnished the designer from which to get out a new line, will, in almost all cases, be found to consist of small samples of many different textures, and it is the designer's duty to reproduce the weave and general effect of the pattern in the construction of the goods that the mill expects to make. Often an elaborate weave in a closely woven sample is wanted to be reproduced in a fabric of

coarser construction, and in instances of this kind, the designer in the mill has an excellent opportunity for showing his ability for designing. It being often necessary for him to cut down the figure or introduce new weaves in order to get the desired effect.

As a general rule it is not good policy to copy too closely everything that comes in the way of suggestions, but it is better to introduce some new features, so as to make the pattern appear more original. However, some good patterns in a high grade fabric may be reproduced in a cheaper class of goods with very good results. There are some mills that make the same fabric year after year, the only changes being that of introducing new designs and colors, and some of the more staple designs and colors will be seen in their lines season after season.

MAKING SAMPLE BLANKETS.

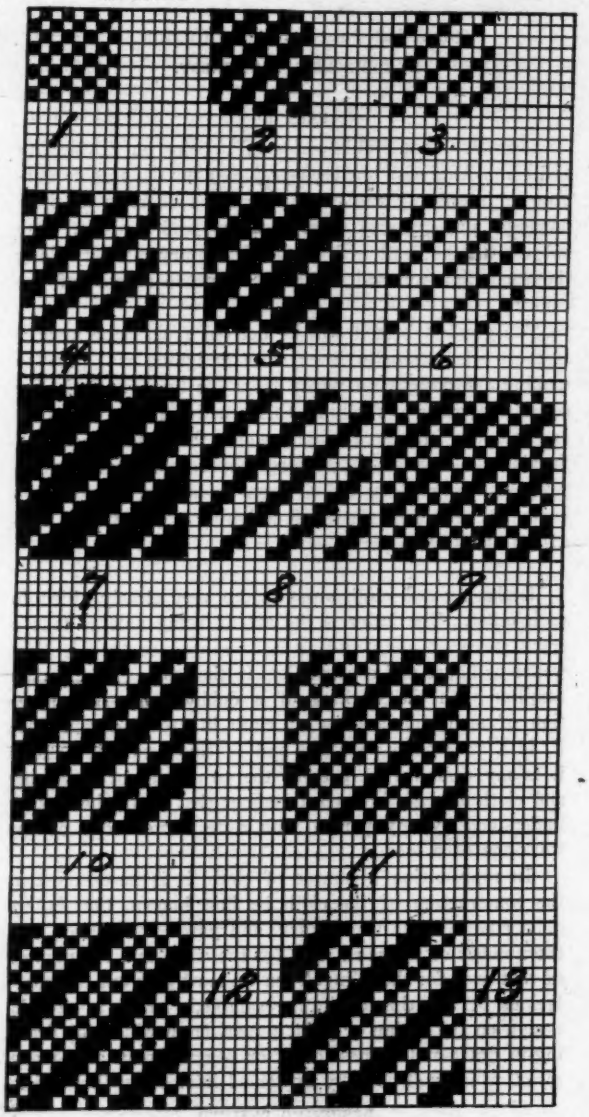
Mills have different ways of getting out their samples or sample blankets. Many blankets are made with six or eight sections, the ground colors of all of them being the same, with different stripes and filling patterns introduced, while others will have the weave and colors different in each section. However, six or eight different colors or combination of colors are generally required for each weave, and when this is the case, it is usually considered best to have the same weave in the different colors woven side by side in the sample blanket. The harness chain may be changed as often as is desired in order to produce different effects, and when the blanket is completed, the same weave in the different colors will be side by side, and the man who selects the styles can more readily see the effect of the same weave in the different colors. The blankets are sent to the selling agents, who select the different styles that they think will be attractive and sell well to the trade. The samples, selected by the selling agents, are sent back to the mill, which in turn makes up four or five yard lengths, from which the sample cards or selling samples are made up. When the construction of the fabric has been determined, the proper development of the sample blankets has much to do with the success or failure of the season's business.

Every woven piece of cloth is made up of two distinct systems of threads, known as the warp and filling, which are interlaced with each other to form the fabric. The warp threads run lengthways of the piece of cloth and the filling runs across, or from side to side. The manner in which the warp and filling threads interlace with each other is known as the "weave." When the word "end" is used in connection with weaving or designing it always signifies the warp thread, while the filling is frequently called the "pick."

USE OF DESIGN PAPER.

Design paper is used to show the interlacings of the warp and filling, or in other words, to reproduce an imitation of the cloth on paper, from which the necessary information required for making the drawing-in draft and harness chain for reproducing the pattern, may be obtained. In addition to this, a design fully laid out on design paper will give a fair idea of just how the woven fabric will appear, the only difference being that the design shows the warp and filling interlaced exactly as they are in the cloth, only on a much larger scale, and often an effect that appears rather large in a design will come out very small in the cloth produced. This, of course, depends entirely on the texture or construction of the cloth. The figure of a design will appear larger in a piece of cloth with fewer warp and filling threads to the inch than in one where there are more ends and picks in the same space.

As has been previously stated, the purpose of design paper is to show the interlacing of the warp and filling. The space between two vertical lines, or each row of squares running from top to bottom of the design paper represents a warp thread, while the distance between two horizontal lines, or each row of squares running from side to side of the design paper, represents a filling thread. It will be noted that all design paper is ruled off by heavier lines into blocks, every block containing the same number of squares. This is done merely for the purpose of making



PLAIN WEAVE, AND TWILL WEAVES.

the counting of the size of a repeat of pattern somewhat easier, and the manner in which the design paper is ruled by these heavy lines has nothing whatever to do with the design being made. The design paper used for making the illustrations for this article is 8x8, as there are 8 squares between each of the heavy lines. We could have used 10x10 or 12x12 with the same results. The 8x8 or any other paper in which the squares are the same dimensions is ordinarily used for designing for harness work. However, in making a Jacquard design, the proper size of the

paper to use is determined by the number of warp and filling threads there are to one inch in the finished cloth. For instance, if a piece of cloth when finished, counts 120 warp threads and 80 picks to one inch, then paper of the same proportions should be used for making the design, which in this case would be 12x8, which means that there are 12 squares warp ways and 8 squares filling ways in each one of the large square blocks on the paper. The reason for this is that the rows of squares on the design paper shall occupy the same relative space that the warp and filling threads do in the piece of cloth. If the proper size of paper is not used in making a large design, the figure in the cloth will appear all out of shape and proportion, while it appears accurate on the design paper.

The method of showing on design paper how the warp and filling interlace with each other, is done by filling in certain squares with paint, or pencil marks, while the others are left empty. In the illustrations accompanying this article, the entire square is filled in, while in practical work it is the general custom to make a cross with a pencil to indicate the squares that are to be filled in. When a square is filled in, it indicates that the warp thread is over the filling thread at this point, and when a square is left blank, it shows that the warp thread is under the filling at this point. In other words, filled in squares signify warp up, and empty squares signify filling up, thus, when a warp thread is up on a certain pick, the harness which controls this thread must be raised on this pick, and as will be explained more fully a little later on, every warp thread which works alike is drawn in the same harness.

THE PLAIN AND TWILL WEAVES.

The simplest weave is the plain weave, as shown in Fig. 1, in which every other end and every other pick works alike, and therefore the pattern repeats on two ends and two picks. The 1st end is drawn through No. 1 harness, the 2nd through No. 2 harness, the 3rd through No. 1 harness and the 4th through No. 2 harness, and so on throughout, while the harness is raised and lowered alternately at each pick of the loom.

After the plain weave, the next weaves that are found to be largely used are the twill weaves. The twill weaves are different from the plain weave in that the threads do not interlace with each other as often as in the plain weave. Twill weaves are readily recognized by the diagonal lines that they form across the cloth. In the regular twill weave, these lines are formed across the cloth at an angle of 45 degrees, but this angle may be changed by varying the construction of the twill and by changing the picks in the fabric. In designing a regular twill weave, the principal point to be kept in mind is that every successive warp thread must interlace with every successive pick, that is, if the first end is raised on the first pick, then the second end must be raised on the second pick and the third end on the third pick, and so on in this manner until you have a complete repeat of the weave.

The smallest number of harness that can be used to make a twill is three. On three harness it is possible to make only one twill, that is the 1 down and 2 up twill, as shown in Fig. 2. This weave repeats on three ends and three picks, and Fig. 2 shows three repeats of the weave. This weave may also be made, 1 up and 2 down, as shown in Fig. 3, in this case the top side of the cloth will show the more filling or the filling effect, while Fig. 2 shows the warp effect.

On 4 harness, it is possible to make only two regular twills. They are the 2 up and 2 down twill as shown in Fig. 4, which is an even sided twill, that is, the same amount of warp and filling appear on both sides of the cloth; and the 1 down and 3 up, as shown in Fig. 5. The latter will show the warp effect on the face of the cloth when weaving, and if it is desired to weave the cloth with the filling effect up, the weave will be painted 1 up and 3 down, as shown in Fig. 6. It will be noted that an even sided twill can only be produced on an even number of harness.

On 5 harness, there can be made three different twills. Fig. 7 shows a 1 down and 4 up twill; Fig. 8, a 2 up and 3 down; and Fig. 9 a 1 down 1 up, 1 down 2 up twill. It will be noted that these three weaves will appear warp effect up, and if it is desired to weave the cloth with the filling effect up, it may be done by leaving the filled-in squares empty, and filling in the empty squares. Each one of these designs repeat on 5 ends and 5 picks.

From the examples given, the construction of twills will be readily understood, and it will be seen that the more harness that are used, the greater will be the variety of twills that can be made. On 6 harness it is possible to make five different twills, and on 7 harness, eight different twills can be made.

Figs. 10, 11, 12 and 13 show two repeats each, of 8 harness twills.

(*To be Continued.*)

WOOL MANUFACTURING.

CARE OF WEAVE ROOM WASTE.

IMPORTANCE OF SYSTEM. FILLING WASTE AND BAD PRACTICES. DEPRECIATION IN VALUE OF YARN. TO DECREASE WASTE MAKING. CARE OF COLORED WASTE.

(*Contributed exclusively to* COTTON.)

BY O. F. IRELAND.

The question of waste in any department of the woolen mill is of great importance, and not infrequently the success or failure of the business depends upon the system carried out to properly care for and dispose of that which accumulates. Very often this is the last matter that is considered, but where this item is well systematized, it will be found that there is no lack of system in other matters pertaining to the mill. On the other hand, if there is manifest negligence in this matter, it will often be found that the slip-shod methods are not wholly confined to the waste end of the business.

In some particulars, the waste question pertaining to the weaving department, is of more importance than in any other part of the mill. One reason why this is true is because of the increased value of the stock at this stage of manufacture. In the carding room, much of the waste is composed of the flyings and droppings from the machines, is the shorter and poorer part of the stock, and is loaded with dead and kempy fibers and foreign matter,

which is of inferior worth. This, however, is not true of weave room waste, and a greater part of the waste is as valuable as that stock which goes into the cloth.

FILLING WASTE AND BAD PRACTICES.

The bulk of the waste in the weaving department comes from the filling, and where there is an excessive amount, it is usually due to the lax methods of the weavers, or the want of proper discipline on the part of the overseer in charge. The weaver can not be expected to exercise care in preventing waste if it is not required of him, and it is too often the case that he is ignorant of the full importance of the matter and does not realize the money value entailed. The practice of pulling the filling from the bobbin at every change of shuttles is sometimes carried to such an extent that very much good yarn goes into the waste box that should go into the cloth. In the absence of proper restrictions, and a desire to keep the loom going, there is bound to be a growing tendency to undue waste, and no one can be more to blame than the overseer who fails to correct it.

The weaver, whose pay depends on the yardage woven, very naturally falls into practices that will insure the best wages with the least possible effort on his part. In other words, he will strive to avoid mispicks, breakages and other imperfections that will count against him, and possibly cost him a fine, while he will be less concerned about the amount of waste made, which does not show at the inspector's perch. A usual custom among weavers is to change shuttles before all of the yarn on the bobbin is woven into the cloth, rather than to watch the work more closely and thereby use all, or nearly all the filling from the bobbin before changing. This waste of good yarn is far more expensive to the manufacturer than one would expect, who has not studied the subject.

DEPRECIATION IN VALUE OF YARN.

Let us look at the cost of this waste from the manufacturer's standpoint,—a view the weaver does not usually take unless he is properly instructed regarding it. Suppose the raw stock in the yarn cost 60 cents per pound for the wool and 20 cents for the shoddy, and the mixture is 70 per cent. of wool and 30 per cent. of shoddy, which makes the cost of the mixture just 48 cents per pound at the start. Now suppose the coloring, carding, and spinning carries the value up to 52 cents, which is a low estimate. This is the yarn used in the weave room. The waste made from this yarn would probably not sell for over 6 cents per pound. The difference in price between 52 cents and 6 cents represents a depreciation of over 88 per cent. in the value of the yarn. The weaver is not aware that the yarn is depreciated in value to this extent by making waste, but the overseer should understand it as he is there to watch the interests of his employer, and he should see that the amount of stock thus reduced in value is kept as small as possible. The actual cost of the loss of four picks from every bobbin of filling used in a room of 50 looms would doubtless surprise the weaver, and possibly some overseers who have not given the matter due consideration.

TO DECREASE WASTE MAKING.

The writer does not claim that all filling waste is needless, but in some mills there is an excessive amount made, even where it is hardly suspected. "Soft" bobbins from the spinning room, caused by having been run for a time on the mule with its end down, making soft places at the bottom or middle of the bobbin, are a source of waste, if the weaver is allowed, as in some cases, to pull the yarn off and throw it into the waste box. It is seldom that these bobbins will run without breaking while weaving, thus causing trouble to the weaver, and increasing the chance of making imperfections in the cloth. They are neither profitable to the weaver nor to the mill. Such bobbins should be laid aside, either by the spinner or the weaver to be rewound, which will make them suitable for weaving.

Now what is the best method to adopt to regulate the waste question and keep the quantity at a minimum? Some overseers have each weaver's waste weighed separately, and keep a weekly record, and impose a fine for an excess over a stipulated amount. It is a good plan to know just how much waste each weaver has made but fining is not always advisable, as it is likely to lead to trickery on the part of some of the weavers, and some waste that should go to the scales may float down the stream, or be otherwise disposed of.

In connection with the knowledge gained by the weighing of the waste, the overseer should keep an eye out for carelessness or indifference on the part of his help, and correct them at the proper time.

When a weaver's attention is called to the fact that his weekly amount of waste made is excessive, he may claim that bad work was the cause, and possibly with some degree of reason, but, when, through watchfulness of the overseer, he may be seen making unnecessary waste, he should be corrected at once. This will teach such weavers that their methods are being watched, and they will accustom themselves to more care in the matter. When an overseer finds that any are disposed to ignore his instructions by failing to fall in with the discipline of the room, the sooner their services are dispensed with, the better.

CARE OF COLORED WASTE.

If a variety of colored fillings are used in weaving, it is advisable to have a separate receptacle for each color of waste. If this is impracticable, the colors that predominate, at least, should be kept separated, and the others that can not be kept separated should be kept as a mixed lot. The former can be picked or garnetted and used again in a similar mixture without the expense of re-dyeing; or can be sold to better advantage if not used in the mill. If the ground filling be in two or three colors, with fancy effects of other colors, it is an easy matter to keep the predominating colors separate; and the fancy colors and such as get unavoidably mixed can be kept together as a mixed lot. The cost of garnetting this kind of waste is only 3 to 4 cents per pound, even if it has to be done elsewhere, which added to its selling value, would make it profitable stock to use, and considerably below the cost of equally good shoddy.

It will readily be seen that the quantity of waste avoided counts as so much stock saved from needless depreciation, and that which can be used again is partially restored to its original value. In fact, it may be considered as taking the place of so much new stock, where it is put back into its own mixture again. One of the most important duties of an overseer is to educate the weaver in the importance of avoiding unnecessary waste, what it means to the mill, and to insist upon methods that will avoid an excess of waste. By such a plan a marked showing for the better will surely follow in many mills where insufficient attention has been paid to this important matter.

DESIGNING BEDFORD CORDS.

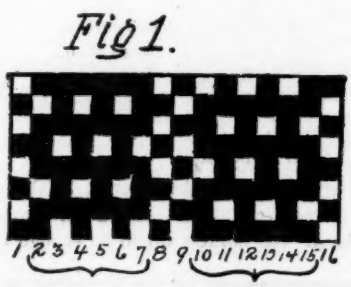
All Cotton Bedford Cords.—Mixed Bedford Cords.—All Worsted Bedford Cords.—Twill Face Bedford Cords.

(*Contributed exclusively to* Cotton.)

by emil kahn.

Bedford cords form one of the most popular and distinctive types of fabrics used for wearing apparel. They are made of various numbers of yarn, both cotton and worsted, and in widely different textures, yet always maintaining their characteristic and distinguishing feature, namely, raised semi-circular warp stripes or cords. These cords vary in width from about 1/16 to ½ inch, and are of various degrees of prominence, depending upon the nature of material used.

Bedford cords made entirely of cotton are used extensively for shirtings, shirt-waist suits, and infants' coats. For these purposes the fabric is usually woven with unbleached cotton, then bleached or dyed, and sometimes



Bedford Cord Designs.

printed. The face weave of these fabrics is usually a plain weave, but in order to form the cord effect, every alternate pick or two picks, or more, of the filling are made to float under the entire number of ends that form each individual cord. This floating of the filling tends to draw or pull the ends under which it floats into a semi-circular position, thus forming a cord.

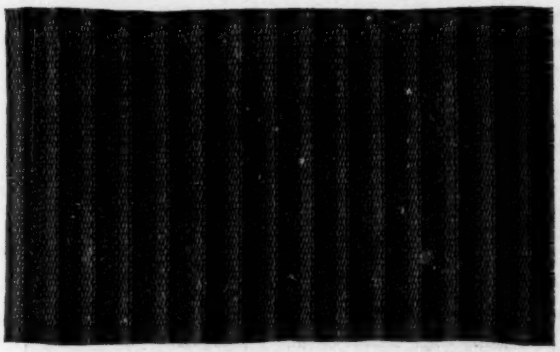


Fig. 4. Sample of Bedford Cord Fabric.

These fabrics require a comparatively high texture, consequently fine counts of yarn are required to get desirable effects for shirtings, shirt-waist suits, or infants' wear.

Fig. 1 is a design on point paper, and illustrates the simplest type of Bedford cord weaves. This design shows the filling floating under every alternate pick in one cord, and weaving in to form the face of the adjoining cord. Ends numbered 2 to 7, and 10 to 15, inclusive, form the circular cord effect, whereas ends numbered 1, 8, 9 and 16 are the cutting ends, which form a sort of groove or division between the individual cords. This weave, however, is very little used in cotton fabrics, although less picks per inch of a given count are required than by using weaves illustrated in Fig. 2 and Fig. 3. It will be seen from these designs that two successive filling threads are floated under the cord

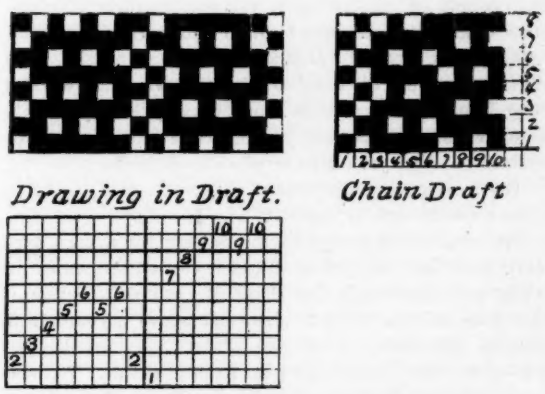


Fig. 5. Working Design of the Pattern.

threads and then two successive filling threads weave into the face of the cord. These weaves produce a more desirable fabric by giving a fuller or more circular cord effect than that produced from Fig. 1, and are almost entirely used for producing cotton Bedford cords.

The designer should be careful, in designing these weaves, to have the one or more filling threads float under one cord and interlace with the adjoining cord, thereby bringing an equal number of harness upon each pick. The idea is readily grasped by comparing Figs. 2 and 3. These two weaves give precisely the same effect in the fabric, but the fabric of Fig. 2 has widely different proportions of warp and filling on the face of the fabric for the first two

picks from what it has on the third and fourth picks, which makes an uneven strain on the loom; whereas Fig. 3 shows the first two filling threads interlacing with one cord while they float under the adjoining cord, by which arrangement as many warp threads are raised on the third pick as on the first, and as many on the fourth as on the second pick.

FIG. 6. SAMPLE OF PIECE DYED BEDFORD CORD.

As previously mentioned, Bedford cord fabrics, made up for shirtings, etc., are composed of a high texture and fine counts of yarn. A good construction for a Bedford cord is

96 ends per inch of 1/40s cotton,
88 picks per inch of 1/50s cotton,
Width in reed, 35½ inches; finished width, 32 inches.

ALL COTTON BEDFORD CORDS.

In dealing with Bedford cords used for ladies' dress-goods, the designer has ample opportunity for obtaining very novel effects. For this grade of fabric, there is a large variety of constructions, and combinations of materials. Some are made up of cotton and worsted; some all worsted; some worsted and silk; and some of all silk. We will first direct our attention to the cotton warp and worsted filling fabric. This may be made to very closely imitate the all worsted goods, and very effective patterns may be obtained in either yarn dyed or piece dyed goods.

The most economical method of construction would be to use a weave, such as shown in Fig. 1.

The usual arrangement of the pattern for a yarn dyed fabric is to have a series of different colored stripes in the fabric, as, for example, one stripe of medium blue, one of dark blue, and one of light blue; and weave the same with one pick light blue and one pick of dark blue, provided, of course, we have a pick and pick loom available. If, however, we have only the one shuttle box loom, we must confine ourselves to only one color of filling. The high texture of the warp obscures the filling to a great extent, so that quite clear and distinctive colored warp stripes may be obtained with but one filling.

Another effective yarn dyed pattern may be made by contrasting two colors in adjoining cords, such as a medium blue to alternate with a medium green, and at regular spaces of about two inches to be broken with a much deeper color. A sample of this cloth is shown in Fig. 4. These cords may be composed of eight ends of each color and indicated to the beamer as follows:

Reed 18x4.
Width in reed 38½ inches.
Finished width 36 inches.
77 threads per inch finished.
56 picks per inch finished.

Ends in fabric 2712
Ends in selvage 56

Total ends in warp 2768

Warp 2/40s cotton. Filling 1/32s worsted.

COMPLETE LAYOUT FOR BEAMER.

28 ends white—selvage.
8 ends blue.
4 times { 8 ends green, 8 ends blue }
8 ends black.
20 { 7 { 8 ends blue, 8 ends green } 8 ends blue, 8 ends black }
4 times { 8 ends blue, 8 ends green }
8 ends blue.
28 ends white—selvage.

TOTAL ENDS IN WARP.

1360 ends blue, 2/40s cotton.
1184 ends green, 240s cotton.
168 ends black 2/40s cotton.
56 ends white selvage, cotton.

2768 ends, total.

Fig. 5 shows the complete design with drawing-in draft and harness chain draft. The draft shows that ten harness are used. Six harness would be enough to produce

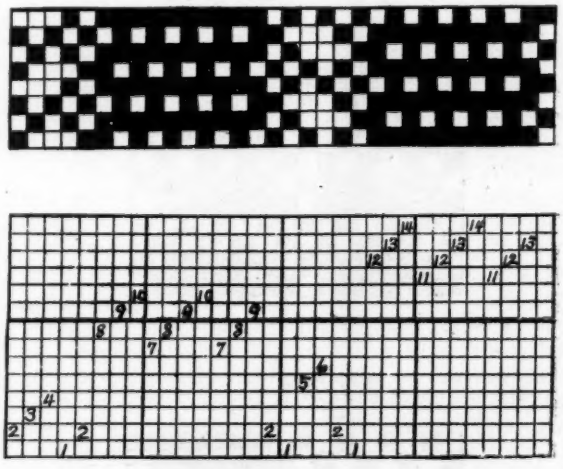


FIG. 7. WORKING DESIGN FOR THE PATTERN.

the weave, but to prevent overcrowding of the heddles, the cords are drawn on sets of four harness each.

MIXED BEDFORD CORDS.

A very effective piece dyed fabric is shown in Fig. 6 and is produced with the following construction:

Reed 20x4.
Width in reed 46 inches.
2/40s cotton warp unbleached.
1/32s worsted filling, 62 picks per inch.
Finished width, 42 inches.

The warp is all unbleached cotton yarn. 32 ends is a repeat of weave. Total number of ends required for the given width, selvage included, is 3680 ends. Each selvage has 28 ends. Fig. 7 shows the complete design with drawing in draft and harness chain draft. The warp is drawn on 14 harness.

(*To be continued.*)

KNITTING

TYPES OF FEEDS ON LOOP WHEEL KNITTING MACHINES.

MAKING A STITCH. REVOLVING AND STATIONARY PUSH-DOWNS. SINKERS. PRESSERS. LANDERS. CAST OFFS.

(*Contributed exclusively to* COTTON.)

BY ERNEST TOMPKINS.

The original domestic loop-wheel knitting machines were made so that the arrangement of the elements of the feed; that is, the burs, pressers, etc., was practically fixed as to location on the machinery. The increasing demand for different kinds of goods brought about an increase in the flexibility of the knitting machine, so that at the present time most of the American machines are built practically upon a universal or movable plan; that is, each element of the feed may be placed in any position in regard to the needles; either in or out, up or down, or completely around the circle. Obviously many combinations may be made with a machine of this kind, in fact, so many, that it is high time an attempt was made to classify, illustrate, and explain the different combinations.

At present, this knowledge is largely the individual possession of knitting foremen. It is based almost entirely on their experience, so that in any particular case it is limited to the extent of that experience. If this information could all be brought together in good form and put before textile men, not only would the rising operative have more chance to progress rapidly, but the knitting machine builders would be saved unnecessary expense, due to the necessity of demontstrating again and again what had already been demonstrated to some other mill that desired the information. The following exposition is submitted as a brief attempt at supplying the needs enumerated above.

This discussion applies to domestic loop-wheel knitting machines with parallel spring-beard needles, that is, the ordinary type of American spring needle machine. It does not apply to latch needle machines nor to spring needle machines having jack sinkers.

The direction of motion of the cylinder is taken anticlockwise. For reverse motion, the arrangement of the parts has simply to be reversed. The five operations ordinarily involved in the formation of the plain stitch and the devices used in each operation are shown in the following table:

OPERATION	METHOD
1 Pushing down cloth on needles	Cloth wheel; cam, or wire (stationary push down).
2 Sinking new loops	Sinker; called loop wheel, feed wheel, or stitch wheel.
3 Pressing points of beards into eyes	Presser; round, stationary Hammond, Bailey.
4 Landing old stitches over points of beards	Lander.
5 Casting off old stitches	Castoff or knocking over wheel.

The result of these operations is the plain knit stitch. Other stitches will be considered later. It will be considered, for convenience, that the machine has been running and cloth is already on it, the last row of stitches being in the heads of the needles, owing to the takeup tension on the cloth.

PUSHING DOWN CLOTH ON NEEDLES.

Before the new stitches can be formed these old stitches must be pushed to the base of the needles, so that the latter will be free to take the new loops. This operation is called "pushing down." Among the requirements for it are the following: The deviee used should not catch the fabric when a hole occurs nor when the cloth leaves the needles. It should not produce so much friction that the fabric is unduly strained nor the needles disturbed appreciably from their normal positions. The extent to which the cloth is pushed down should not be much more than is necessary to keep it at the base of the needles.

The push-downs are of two classes—revolving and stationary. The revolving push-down, which turns on its own axis, puts less friction on the cloth and generally less bending on the needles, but it is limited as to its diameter and should be neither very small nor very large. If it is very small, it holds the cloth back rather than pushing it down, owing to the sharp curvature. If it is very large, it requires excessive room above the needles and crowds the cloth too far down below the needles. As a consequence the stationary push-down is customarily used where the extent of cloth to be depressed is extremely short, or is longer than the average. Indeed it is used in all cases by many knitters who object to the revolving push-down.

In construction the revolving push-down is simply a wheel, generally of cast-iron, supported above the needles and running with its working surface just inside of them. The stationary push-down is a boat-shaped piece of metal, either cast or cut out of the sheet, polished and corresponding to the curve of the needles.

SINKERS.

The sinker bur, which revolves on its own axis, is used to feed the yarn up under the beards of the needles in order to make a new stitch.

The sinker bur is adjustably located on a projection from a horizontal shaft, which is fitted with a spiral spring, so that the bur may be moved backward in case a bunch of yarn comes between the needles and the sinker bur, and thus prevents injury to the needles. When the bunch passes, the sinker bur is again pressed up to the needles.

PRESSERS.

The pressers, like the push-downs, are of the same two general classes—revolving and stationary.

As its name indicates, the function of the presser is to

press the points of the beards into their respective eyes, so that the stitches which are resting on the shanks of the needles may be brought up over the beard points by the lander. It thus follows that it is necessary to have the lander follow very closely in its action upon that of the presser.

Fig. 1 illustrates a plan of a revolving presser. It has the advantage of simplicity and only a slight friction on the needles. Moreover, when worn, it may readily be turned down without returning it to the knitting machine maker. Also its circumference may be notched to mispress predetermined needles to produce tucked pattern work. Among its disadvantages are the space that it requires, and the excessive pressure on the needles at the middle of its contact.

Fig. 2 illustrates a plan of the Hammond presser, which is of the revolving type, but as compared to the ordinary round presser, requires less space, and presses the needles less severely at the middle point of its contact.

Fig. 3 is a plan of the Bailey revolving presser, which is really a round presser mounted on top of a lander, and hence the name "combination presser" is sometimes applied to it. It is also called a "plush presser," because it was formerly much used after the tie-thread sinker in the plush feed. This presser runs at an angle with the needles, so that it slides upward on the beards as it revolves with them.

Figs. 4 and 5 illustrate stationary pressers. They are essentially narrow plates fastened against the beards of the needles. They are generally made of steel, but glass, fiberoid, and other materials are sometimes used. The length and shape of the needle bearing portion are changed according to the requirements of the work and the ideas of the

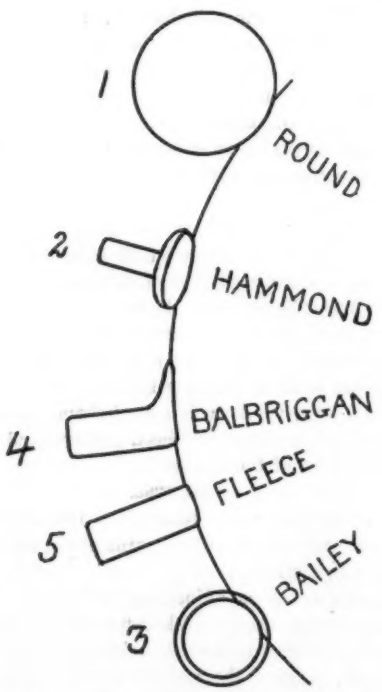
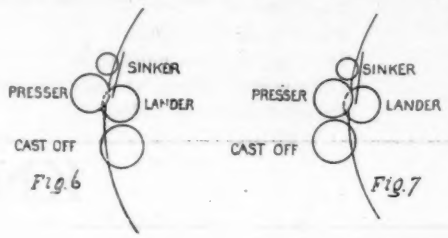


DIAGRAM OF DIFFERENT STYLES OF PRESSERS.

user. The presser illustrated in Fig. 4 is called a "long nose" presser, and is used for closing the beards of the needles directly after the new loops have been placed thereunder by the sinker bur, so that the yarn can not drop out. The presser illustrated in Fig. 5 is used extensively for fleece work.

The lander, as mentioned, is used to bring the stitch up



DIAGRAMS OF DIFFERENT FEED COMBINATIONS.

above the point of the beard, while the presser is holding the latter closed, and usually works on the inside of the cylinder circle. It is set just a trifle further around on the cylinder than the presser.

The castoffs are generally placed on the inside of the needles but may be used on the outside, in which case, of course, the angle of the blades has to be reversed.

In the diagrams where pressers are represented, the round presser is illustrated in most cases, since this serves for either plain or tucked work. It should be remembered, however, that for plain work, many of the other pressers mentioned may be substituted and generally are when it is desired to condense the feeds.

Probably the most commonly used plain feed is illustrated by Fig. 6. It is made up in the order of needle rotation as follows: (1) Push-down, either round or stationary; (2) sinker; (3) presser; (4) lander; (5) inside castoff. The push-down is not shown in the diagram, but its position is just ahead of the sinker bur in the machine. It may be comparatively small, because it has to cover only the sinker and presser. Obviously if the presser is made very small and placed close after the sinker bur, the push-down may be reduced still more. It is also evident from the diagram that the castoff takes considerable space, especially as it is the largest bur of the combination, and is on the inside of the needles where the room is more restricted than on the outside. A number of variations of this plain feed are made in order to reduce the space taken by the castoff, as it is frequently desirable to add to the number of feeds per cylinder for various reasons, among which may be mentioned: increasing the production, increasing the width of horizontal stripes, obtaining elaborate patterns, etc.

Fig. 7 illustrates a plain feed with the castoff on the outside. It is made up as follows: (1) Push-down; (2) sinker; (3) presser; (4) lander; (5) outside castoff. The space required by this feed is less than that required by the preceding feed, for two reasons. There is more available room on the outside of the needles, and the castoff may

be brought closer to the working portion of the lander, since it is farther from the center of the cylinder.

Among the disadvantages of having the castoff on the outside are the following: The cost of the machine is increased, because the outside castoff requires a stand support which is more expensive than the inside support; the outside castoff is more likely to overreach and break needles, not only because it has a slightly smaller arc of contact and consequently less needles to drive it, but because the beards and eyes of the needles afford convenient catching places for the blades when they do overreach; also with heavy yarn or average weight yarn the casting off is not as positive, consequently tucks may occur at bunches and seeds, or even when these do not appear. This feed is therefore best adapted to a high production with light yarn or a long loop, or a combination of yarn and loop, which does not require much assistance in the casting off operation.

Fig. 8 illustrates a condensed feed in which the lander and presser are combined, making what is called the Bailey or combination presser. It is made up as follows: (1) Push-down; (2) sinker; (3) Bailey presser and lander; (4) inside castoff. This has the advantage of good casting off, but the landing and the pressing are not all that could be desired, especially when the yarn is heavy or the stitch is tight. The combination presser comprises really two distinct elements—a lander and a presser. They are not independently adjustable as manufactured, therefore it is difficult to get the landing operation satisfactorily without having the pressing operation unsatisfactory, or vice versa. Moreover, the landing can not be as well performed on the outside of the needles as on the inside, since on the inside of the needles the body of the lander raises the cloth already knitted, thus helping the lander blades to raise the stitches. This feed is not used as much as No. 7.

Fig. 9 illustrates an abbreviation of the feed shown in Fig. 8. It is composed as follows: (1) Push-down; (2) sinker; (3) Bailey presser and lander.

For this feed, the Bailey presser is made comparatively large in diameter, so that its blades lift the stitches practically the entire exposed length of the needle. In other words, the Bailey presser is made to perform the operations of the presser, lander, and outside castoff. This eliminates the use of any inside burs whatever and makes a very condensed feed. It is practical only with a free stitch, and even at that the yarn should be strong and free from bunches or imperfections.

Fig. 10 is a condensed feed which may be used where the stitch is not extremely free. It is made up as follows: (1) Push-down; (2) sinker; (3) stationary presser; (4) combination lander and inside castoff, sometimes called a "double bur" because it performs the functions of two burs.

The landing and the casting off is performed on the inside, which is more advantageous than on the outside. However, the bur has to be nicely adapted to the needles since it engages a considerable number of them. If it runs too tightly or too loosely or has insufficient reach, its operation is likely to be troublesome. Indeed it is so difficult to get a commercial bur adaptable to the different lengths of needle and stitch that this method is not frequently used.

DYEING, BLEACHING AND FINISHING

CHEMICALS USED IN THE TEXTILE INDUSTRY.

BY DR. FREDERIC DANNERTH, CONSULTING INDUSTRIAL CHEMIST.

(*Reported exclusively for* COTTON.)

LECTURE V.

ANALYSIS OF SOAPS AND OILS.

The fact that soaps and oils can be mixed with other materials of lower value without this addition being perceptable to the casual observer has offered unusual opportunities for the extended use of adulterants in this branch of industrial chemistry. This will be readily understood when we consider that the majority of oils possess a yellow color, are transparent, and are miscible with each other. Soaps are opaque and may therefore be adulterated with any one of a large number of substances, provided these are white or cream white in color. As soap sometimes costs as much as seven cents per pound, and the price of most of the adulterants ranges from one to three cents per pound, the unscrupulous manufacturer is enabled to make a very respectable profit if the consumer is not particular about having his soaps analyzed.

A complete analysis of this material would include a determination of the amount of the following constituents:

(1) water, (2) foreign organic matter, (3) foreign mineral matter, (4) perfumes and coloring matter, (5) colophony, (6) glycerin, (7) total alkali, (8) free alkali, (9) total fatty acids, and (10) free fat.

The amount of water in soap may range from 20 to 30 per cent., but the latter figure should be placed as the maximum, when buying on specification.

The foreign organic matter may consist of sawdust, bran, starch, or hydrocarbons, all of which are insoluble in alcohol and water.

The foreign inorganic or mineral matter found in various samples of soaps which have been examined include: sand, pumice, infusorial earth, china clay, chalk, whiting, talc, and fullers earth.

Perfumes and coloring matter should be absent in all soaps used for textile processes. The chief object of these additions is to cover up bad odors or as in the case of castile soaps, to imitate the color of the genuine article, or convince the buyer that "good olive oil" has been used in the manufacture of the soap.

Colophony or rosin is generally added to reduce the price of the soap, but is in some cases of distinct value, as for example, in the boiling off of cotton. When buying rosin soaps, the amount of rosin contained should invariably be stated by the seller or demanded by the consumer.

Glycerin will be found in soft soaps and in cold process soaps. It is a very desirable constituent of soaps intended for cotton softeners and in general where the soap is intended to have a softening action.

The total alkali includes that which is present as salt of the fatty acids (sodium stearate) as well as any which may not have entered into chemical combination in the process of saponification. Soda ash and pearl ash are in

some cases purposely added to scouring and fulling soaps for wool in order to lower the cost of scouring low grade, cheap goods. The presence of alkaline carbonates is not always objectionable, as they assist to a certain extent in softening waters containing sulphates (gypsum).

The determination of free alkali in soap is very important when the latter is used in the manufacture of high-grade woolens and worsteds, as an excess of free alkali renders the goods harsh and they lose much in value and appearance. A simple qualitive test consists in drying a cake of the soap by laying it near a radiator or stove, and then applying a few drops of an alcoholic solution of phenolphtalein. A red coloration indicates the presence of free alkali.*

The estimation of the total fatty acids is important as it gives a clue to the presence of any considerable amount of water or other adulterant.

Free fat is that which has not entered into chemical union with the caustic alkali. This may be due to the fact that an insufficient quantity of alkali was used, or the boiling may not have been carried out thoroughly, in which case the soap will contain both free fat and free alkali. If goods are washed with soap containing free fat, a soft "feel" will be imparted but we must not forget that some fats are very prone to decompose, in which case the fiber may be tendered, the color of the goods may be altered, or the fabric will acquire an objectionable odor.

Vegetable and animal fats are for the most part compounds of glycerin with one or more of the fatty acids, such as stearic, palmitic, or oleic acid. The chemist defines these fats as tri-glycerides of mono-basic fatty acids,—thus olive oil consists principally of palmitin (or glyceryl palmitate) and olein (or glyceryl oleate).

Vegetable and animal waxes are compounds of fatty acids with higher alcohols. These are termed "esters" and are represented by a large variety of natural products among which may be mentioned beeswax. This wax is a mixture of myricin (or myricyl palmitate) and free cerotic acid.

Mineral waxes and oils are mixtures of hydrocarbons, some of which boil at temperatures as low as 122 degrees Fahrenheit while others are of such a consistency that they pass from the solid to the liquid state when heated to this temperature. Mineral waxes are represented by paraffin and ceresin.

The three classes of substances above enumerated show characteristic differences when boiled with caustic soda (sodium hydroxide). Fats form true soaps which are soluble in water, while glycerin is obtained as a by-product. Vegetable and animal waxes yield soaps soluble in water and higher fatty alcohols which are insoluble in water. Mineral waxes and oils are not acted on by caustic alkalies and hence are unsaponifiable. Although the fats represent mixtures of many triglycerides, the quantity of the same in any particular fat is fairly constant; for this reason the amount of caustic soda required to convert the fat into soap does not vary to any great extent and we therefore say that this amount is "constant." The amount required for olive oil will be almost the same for all samples, but may differ widely from the amount needed to saponify palm oil. These constants are characteristic, and offer us a good method for identifying the more important oils of commerce. Some of the constants frequently determined are:

(1) The saponification number (Koettstorfer number), which indicates the number of milligrams of potassium hydroxide required to completely saponify one gram of fat.

(2) The iodine number (Huebl number) which represents the quantity of iodine which a fat is capable of absorbing and which serves as a measure for the unsaturated fatty acids present. The more important compounds of this nature contained in oils are oleic acid and linoleic acid.

(3) The acetyl number (Benedikt number) which serves as a measure for the oxy-fatty acids (such as oxy-butyric acid) and the fatty alcohols present. The determination is carried out by boiling the fatty acid or the oil with acetic anhydride.

(4) The acid number indicates the number of milligrams of potassium hydroxide required to neutralize the free fatty acids in one gram of fat. The result may be expressed in per cent. in which case we make use of the factor:

One cubic centimeter of tenth Normal alkali = 0.0282 gram oleic acid. In the following table are shown the constants for a few of the fats and oils used in the textile industry.

CONSTANTS FOR FATS AND OILS.

	Iodine Number		Saponification Number		Acetyl Number
Cottonseed oil	102 to	110	191 to	196	20
Castor oil	82	86	176	181	153
Olive oil	80	85	190	196	5
Lard oil	50	85	195	196	..
Palm oil	51	52	200	203	..
Tallow	40	44	193	200	9.8
Cocoanut oil	8	10	253	262	57.3

In addition to these general qualitive tests, the chemist makes use of several special reactions among which may be mentioned:

The Elaidin test, by means of which it is possible to distinguish a non-drying oil (olive oil) from a drying oil (linseed oil). It is carried out by dissolving cubic centimeters of mercury in 12 cubic centimeters of nitric acid (specific gravity = 1.42). Two cubic centimeters of this freshly made deep green solution are then shaken in a wide mouthed stoppered bottle with 50 cubic centimeters of the oil to be tested, and the agitation repeated every two minutes during two hours. When treated in this manner, oils consisting of approximately pure olein yield a product more or less consistent, while the drying oils do not become solid at all.

The Titer test is used to determine the solidifying point of the fatty acids of soap. For this purpose the sample is dissolved in water and the fatty acids are obtained by decomposing the solution with dilute sulphuric acid. These are then separated by filtering and drying. A test tube 5 inches long and ¾ inch in diameter is fitted into a wide mouthed bottle with the aid of a cork. The fatty acids are now melted and poured into the tube so that it appears two-thirds full, after which a delicate thermometer (graduated in tenths of a degree) previously warmed, is suspended freely in the liquid so that the bulb is wholly immersed. When the fat commences to solidify at the bottom of the tube the thermometer must be carefully watched and the contents of the tube slowly stirred there-

*Allen: Commercial Analysis, Vol. II., Part I.
Lewkowitch: Analysis of Oils and Fats.

with. The mercury in the thermometer will at first fall slightly but this is soon followed by a sensible rise at the conclusion of which the mercury remains stationary for at least two minutes. The temperature thus indicated is the "solidifying point of the fatty acids."

The Maumene test for oils consists in mixing a definite weight of the sample with a definite volume of concentrated sulphuric acid. If the conditions of the test are strictly observed, the rise in temperature observed on any particular oil is fairly constant.

The Becchi test for cottonseed oil is carried out with a reagent prepared as follows: Dissolve 2 grams of silver nitrate in 200 cubic centimeters of 95 per cent. alcohol and 40 cubic centimeters of ether, adding one drop of nitric acid. Mix 10 cubic centimeters of the oil with 5 cubic centimeters of the reagent and 10 cubic centimeters of amyl alcohol in a test tube. Divide into two portions and heat one-half in a bath of boiling water for 10 minutes, and compare with the portion not heated. Any blackening due to reduced silver shows the presence of cottonseed oil.

The Halphen test for cottonseed oil is carried out with a reagent prepared by mixing 5 cubic centimeters of carbon disulphide containing about one per cent. of sulphur in solution with an equal volume of amyl alcohol. Five cubic centimeters of this reagent are mixed with five cubic centimeters of the cottonseed oil, and heated in a bath of boiling saturated salt brine from one to two hours. Any oil containing as much as one per cent. of cottonseed oil will show a characteristic red or orange-red color when subjected to this test.

TURKEY RED OILS.

The analysis of turkey red oils includes the determination of the solubility of the oil in water of 20 degrees hardness (French scale); any turbidity possessed by the solution should disappear on the addition of a small quantity of ammonia water (ammonium hydroxide). The practical test is in any case the most valuable, so that this should not be omitted under any circumstances. It consists in impregnating a small skein of yarn with the oil and putting this skein through the usual process of ageing and dyeing. The quantitive determinations includes the estimation of the amount of:

(1) water, (2) neutral fat, (3) total fatty acids, (4) sulphuric acid present as alkaline sulphates, and (5) soluble sulphonated fatty acids.

The commercial oils are sold as "50 per cent." and "75 per cent." the numbers having reference to the percentage of sulphonated fatty acids present in the oil. The "emulsifying power" of the sample may be tested by shaking up 20 cubic centimeters with 200 cubic centimeters of distilled water. The emulsion thus obtained should be permanent for at least five hours, but well made turkey red oils will remain emulsified for ten and even fifteen hours.

WOOL OILS.

The examination of wool oils includes a determination of the amount of free fatty acids, free mineral acids, and unsaponifiable matter. In addition to this, the oil should be subjected to the Elaidin test in order to determine the presence of drying oils which would make the oil undesirable if present in any considerable quantity. The specific gravity and the flash point should be examined, and experiments with regard to spontaneous combustion of the oil should be carried out. The apparatus now generally used for the latter determination is that devised by Mackey and described in the Jour. Soc. Chem. Ind. (1896 page 90). The amount of free fatty acids permissible in wool oils is frequently placed at 5 per cent., but one of the witnesses in a recent custom house case (see treasury decisions, December 10, 1908, page 12) stated that the fatty acids should not exceed 2 per cent. It should be added, however, that this testimony was in behalf of an importer who desired to import high-grade olive oil for manufacturing purposes.

Practical Problems Discussed by Cotton's Readers.

Discussions of Mill Problems are Solicited for this Department.

TREATMENT OF WOOLEN GOODS.

EDITOR COTTON: The very interesting articles on Wool Manufacturing which have recently appeared in COTTON have been brought too quickly to an end, especially in regard to th elast process, that of finishing, which either makes or mars the manufacturing profit.

If Mr. Ireland's able contributions are to be considered by practical men in the light of a frame work, to be filled in by suggestions, added information, or criticisms, then it is to be hoped that a full discussion may follow, and that many a busy mill man will add his mite to the general review, which, when completed, would constitute a valuable text book, that the textile student would appreciate, and the past masters in the art of manufacturing enjoy.

The pleasure we experience in watching the establishment of textile schools, and following the progress made by the graduates, will be enhanced by the thought that the everyday manufacturer who, week in and week out, is solving some new problem, is generous enough to share his knowledge with those struggling over the same difficulties.

Here we may well stop for a moment and register our appreciation to the editor of COTTON and other kindred trade papers, who generously put their space at the disposal of those who need and are seeking a greater technical knowledge than they possess.

To return to the all-important process of finishing, Mr. Ireland tells us where to look for trouble, and how in a measure to avoid it. He says to keep the goods moving, but the query is, how can that be done? The fabric, as it comes from the final rinse water, will contain at least its own weight of moisture. In that condition, to take it to the dryer is out of the question; so a first stop is made, and two or three pieces are put into the hydro extractor. The centrifugal will throw out about 60 per cent. of this water, but the motion of the extractor will rope up the fabric, leaving some parts wetter than others. When this occurs, look out for stains; it is practically unavoidable in all centrifugal extracting.

May we suggest a remedy? All will agree that a better rinsing can be obtained if the fabric is in the open. Let us suppose that an open washer is used. As the fabric leaves this machine, it is guided to a suction extractor (a machine which is becoming very popular in Europe). As

the piece passes, face up, over the suction slot, the water is drawn from the face to the back uniformly over the entire width of the fabric, eliminating all face stains, ruffling, or creasing of the piece. It is said that the suction extractor has the same extracting efficiency as the hydro extractor. From the suction extractor, the fabric containing then about 40 per cent. of water, can be continuously passed to the tenter; or better still, over what might be termed an intermediate dryer to evaporate about 20 per cent. of the water, leaving 20 per cent. for the tenter to evaporate.

If the suction extractor is practical, and we have yet to hear a contrary opinion, why will this not solve many of the finishers' troubles? Is there anything in this process which would have a tendency to give the wool a harsh feel? Does it not look as feasible for all wool goods as for mixed fabrics (wool and cotton)? Another point in its favor is, a much larger production can be obtained by a continuous process, hence larger profits.

This small contribution must be considered merely as a part of the general discussion on wool manufacturing which I sincerely trust will now follow. *John D. Street.*

ANSWER TO DRAPER LOOM.

EDITOR COTTON: In answering the Draper Loom inquiry in the August issue of your paper, I will say at the outset that a new loom presents a great many problems that are not usually found in the everyday work of a fixer. One of the reasons for this condition is that while the looms are in transit to the mill they are very apt to be jarred and struck by different things, which have a tendency to disarrange the parts from their original positions as they left the factory.

The trouble that very likely caused the filling fork to be caught by the oscillating pawl or "goose head," as it is sometimes called, was with the filling fork itself. It often happens that the prongs of the fork will be bent, so that the fork is not properly balanced, and the pressure of the filling yarn would not be sufficient to push it inwardly far enough to have the top portion raised out of line of the goose head. It would thus be drawn back. In making this adjustment, do not create another trouble by making the fork too sensitive to the pressure of the filling, because the fork will then fly up so high that on returning to its normal position, it will rebound, and will probably engage the "goose head."

The battery motion should be adjusted by an expert. The trouble that Draper Loom mentions may be the result of the goose head not being set to give sufficient movement to the connections which actuate the changing device. In other words, the dog on the loom which has to engage a projection on the slay, is not allowed to spring into proper position to be thus engaged. This seems to be the trouble, especially in view of the fact that the other filling fork would work the battery satisfactorily.

This is my idea of the trouble and you can publish it to see if my brother fixers agree with me. *Draper Fixer.*

Say, Bob, did you know I am writing prize letters these days. Yep—Its just as easy as talking.

ANOTHER ANSWER TO SLASHERS QUESTIONS.

EDITOR COTTON: 1. In making a warp sizing, the following ingredients should be used for one gallon of water:

Alum ..... ¾ ounce.
Tallow .....1½ ounces.
Corn starch ..... ½ pound.

2. The sizing should be boiled 45 minutes before using.

3. The size in the size box should be boiling briskly when the yarn is passing through, if you wish penetration.

4. From four to seven yards of flannel should be used on the squeeze roller.

5. Set the big rod bracket so that the center of the rod will come on a line with the top of the yarn rail at the front of the headstock, and with the top of the roller at the cylinder. Set one-half of the small brackets above the imaginary line and one-half below this line, the idea being to avoid bending or stretching the yarn as much as possible in winding it firmly on the beam.

6. The less cloth you run on the calender or friction roller, the more elasticity you leave in the yarn, which makes the warp run good, and weave properly. Put on just enough tension to keep the yarn from drawing back at the large lease rod.

7. No threads should be changed from one dent to another in the comb while running a beam. If you have a break out, the beam should be taken off and another put on, arranging the threads properly in the dent before starting the frame. The lease should be open at all times.

8. Twelve pounds steam pressure may be used on a slasher for drying a warp for ordinary work, although sixteen pounds may be used if necessary.

9. You do not need any draft to carry the steam from the cylinder, as the steam trap should do this work. *H. L. W.*

SUITABLE GRADES FOR COTTON YARNS.

EDITOR COTTON: The subject I will attempt to discuss is rather complicated and out of the ordinary line of conversation, yet it is a very important one, and should be studied closely by managers or those who have the responsibility of the management of a cotton mill.

I can speak from years of experience and say that the production of good quality means a big item in the financial results of a well managed cotton mill. I will try to show how to obtain this production of quality. At this day and time, practically no manager has the excuse of unsuitable machinery with which to manufacture his product. The great American machinery builders have to-day the most expert technical and practical men that can possibly be secured to design and build their machinery. They also have men who can advise the manufacturer just what kind, and how much machinery is necessary to manufacture a certain product.

The foundation for quality is the card room. Modern equipment in the card room is the first step in the right direction for the production of quality. It may appear that I have omitted an important point closely associated with good financial results, namely, "quantity." But, quality first, and quantity afterwards, is a good motto for a practical mill manager to follow. This quality can only be produced by using a suitable grade of cotton, which is a vital point. Many managers are not very familiar with this important subject. They, of course, know when the color

is satisfactory, and can tell long staple from short. Strict middling cotton at 1-16 cent or 1-8 cent cheaper than good middling often tempts mills to use the former. They figure that just that much has been saved per pound on the cost of manufacturing; whereas, the fact is that they have added this amount to the net cost; for cotton is all graded from a high standard down. No lower grade of cotton than strict good middling should be used for producing numbers where the doublings are less than 9,200. For instance, the mills as a general rule have as low a number of doublings as possible. Low grades of cotton are used, and the superintendent is expected to make any number up to 24s that will produce good results in the weave room; if he fails to produce a theoretical production he is called to account. Then again it frequently happens that strict middling ¾-inch to ⅞-inch staple, will produce better results than 1 to 1 1-16-inch staple.

Take burley cotton; it will draw better, hold together better, make less waste, spin more even yarn, make less flyings, and in the spinning room produce a more compact yarn and give good results in the weave room.

Take a straight fiber cotton; though it be of long staple, the tendency of the fiber is to remain in its original form, and after being spun the yarn is weak. Burley cotton will twist much easier, and smoother, and produce a greater breaking strength. This is a known fact to practical men.

H. K. T.

SPINNING YARNS.

EDITOR COTTON: The subject of spinning yarns very often present some very interesting problems in regard to production and labor for spinning different counts of yarn.

My attention was called recently to one or two statements along these lines; and explanations to prove or refute them will be very much appreciated.

The statements were:

1. A spindle spinning coarse yarns produces a greater length of yarn than one spinning finer counts.

Isn't it true that for finer yarns, the speed of the spindles is increased? And doesn't doffing have to take place more frequently for coarse numbers than for fine, thus decreasing the time the spindles are in operation, and consequently decreases the length of yarn spun?

2. Fine spinning requires more labor for each spindle than coarse spinning. It appears to me that the opposite of this statement is true.

G. C. B.

RAISING THE TEMPERATURE OF FEED WATER IN A HYDRO ELECTRIC MILL.

(*Contributed exclusively to* COTTON.)

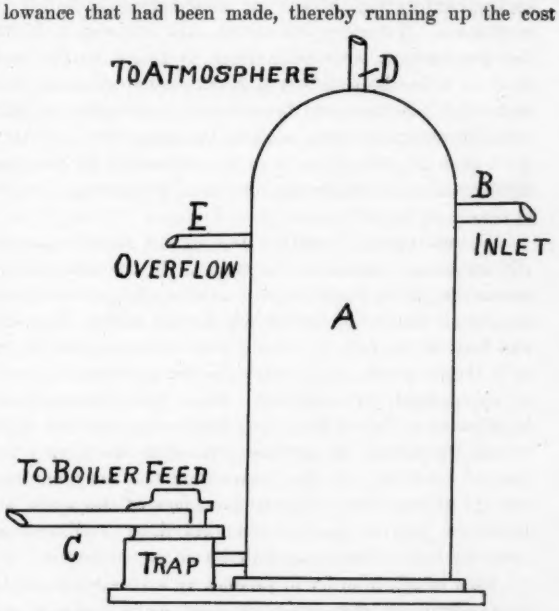
BY W. D. BRIGGS.

The frequent supplanting of steam power by hydro-electric in cotton mills, for driving the machinery, has resulted in some very interesting problems, in other parts of the mill. This is due to the close relationship between the engine and the boiler.

Undoubtedly a great many colored goods mills that made the change, and which have their dye plants, drying machines, etc., and require an amount of steam considerably in excess of the requirement for the steam engine, have been startled at the amount of fuel it now takes to produce the necessary amount of steam to run their dye house and finishing plant.

In figuring the cost per horse-power of their steam plants, these mills had made an allowance of a certain per cent. of steam that went to these departments instead of to the engine, and yet, after the installation of the electric power, they found that it took a great deal more fuel to produce the steam than they had allowed for in the previous calculation.

In this particular instance of which I write, the mill was using a compound engine with the exhaust steam from the condenser and feed water pump going into a feed water heater and raising the temperature of the water to about 180 degrees, from 110 degrees which was the temperature of the water discharged by the condenser. Consequently, when the electric power was turned on, and the feed water taken direct from an outside reservoir, and the feed water heater deprived of the exhaust steam from the condenser, the temperature of the water was lowered very materially, in fact it was down to about 72 degrees. In view of this fact, the fuel account was very much increased over the allowance that had been made, thereby running up the cost so much that some other way had to be devised to raise the temperature of the feed water.



DEVICE FOR RAISING FEED WATER TEMPERATURE.

A very satisfactory and economical method is shown by means of the accompanying illustration.

As previously stated, the feed pump was the only original connection to the feed water heater that was left. The other machines in the mill using steam were the raw stock dryers, dry cans, printing machine, tentering machine, calender, and the hot air fan for heating the mill in cold weather.

The exhaust steam from the above mentioned machines was collected in traps and the condensed steam from these traps fed to an enclosed reservoir A, which in this case was the shell of an old feed water heater, through an inlet pipe B. This hot water was then fed through an outlet pipe C near the bottom of A through a trap to the main feed water suction pipe supplying pump. There is also a pipe D at the top of the reservoir A, opening into the atmosphere,

through the feed water heater, to remove all vaporous steam, and to prevent any back pressure on the initial traps. There is also an overflow pipe E just a little below the inlet pipe, to take off any surplus water in case the feed pump is stopped.

The reservoir used was the shell of an old feed water heater, but anything that will hold water could be used, as there is no steam pressure on it. This device, although not sufficiently large to supply all the water needed, yet it raised the temperature of the feed water to 160—180 degrees, or a gain of from 80 to 100 degrees, which resulted in a considerable saving in fuel.

LETTERS FOR THE PRIZE CONTEST.

Letters will be received for the Contest until Oct. 15, 1909.

A CARDER'S TROUBLES, AND THE IMPORTANCE OF THE CARD ROOM.

(Competitive letter to COTTON.)

BY J. M. G.

It is generally acknowledged that the fundamental and underlying principles of cotton manufacturing for the production of an even, smoothly finished piece of cotton cloth, or a well rounded length of cotton yarn, are to be found in the different processes of that part of a textile plant known as the carding department, or more commonly called the card room. Naturally, the novice may ask why it is that this department, where the cotton is found in the crude state as it has been delivered from gin or compress, is of such vital importance to the succeeding processes of spinning, spooling, warping, slashing, weaving, etc. And if it is of such importance, what must necessarily be the many troublesome and perplexing questions confronting the man in charge of same?

We will explain briefly a few of the facts concerning the cotton as it comes to the carder. In the first place, it leaves the gin or compress in a matted, tangled mass, containing all manner of undesirable foreign matter, from dust and leaf of the field, to an old piece of shoe or shirt, run in at the compress; and further, each bale contains a greater or lesser degree of dampness. From this mass the carder is expected to deliver to the spinner a clean, evenly drawn roving throughout its entire length, with fibers lying in a parallel condition, and at the same time take out a minimum amount of waste from a given poundage of raw stock, at a minimum cost per pound. To meet these conditions successfully some rather knotty problems are presented.

First of all, in order to produce an even card sliver, and subsequently an even rove, we must make a lap of even density or weight throughout a given length at the finisher picker. Now some may say that this is a simple matter, as there is a device on all modern finisher pickers whereby the operator of the machine can correct, by a simple adjustment of a thumb screw or hand wheel, any variation he may note in weighing his laps as they are doffed; therefore all that is necessary is for the overseer of carding to see that his breaker, receiver, and intermediate pickers are in good shape in the matter of speed of beaters, drafts, mote-knife settings, etc., and having a reliable man on his finishers. But we don't always have a reliable man, for although much depends on the finisher, his wages must not go above a certain scale, as the overseer is expected to keep down his cost and at the same time show good results. If he has a good finisher, the latter is naturally looking for promotion, and if it does not come in the mill where he is working, he very naturally seeks it elsewhere; then it is the duty of the carder to find another man on whom he can depend, and whom he must employ at a given wage. It often happens that this man is not available just when he is needed, so the overseer must devise some means of filling the place from the material at hand.

A card is operated by unskilled labor, but the running of a card, and grinding, care, and setting of same are as as different as turning the handle of an old fashioned grinding stone and sharpening the axe. The overseer must be able to judge whether or not his cards are doing good work; and therefore whether or not he has competent grinders and section men. He may have thoroughly competent men under him, but they will constantly come to him with knotty problems, and he must be ever ready with a solution. It may be a loose fillet that must be tightened up by some means other than a regular clothing machine; or perhaps some careless boy has run a bunch of cleaning waste in on the cylinder and faced the wire so badly as to make it impossible for the section man to run the card. But the overseer should find a way to repair the damage, and get his card back to where it will produce a clean, even sliver, without buying new clothing. Without a clean, even card sliver, he can never deliver to the spinner an even roving, and, therefore, if the imperfections are not corrected at the card they will show up throughout all of the succeeding processes. And so it goes throughout his entire department.

In a well organized mill, the carder is held responsible for the cloth weights. This means, that he must watch not only the amount of moisture contained in the raw stock, but must also watch the variation in length of staple and amount of foreign matter contained in same, as short staple or excessive dirt and leaf mean more waste and lighter weights. A lesser degree of moisture would also mean lighter weight. He must also be a good judge of atmospheric conditions in his room. Only experience and good judgment will enable him to do this. Section men should be told when to change draft or crown gears of roving frames for correction of weight variation in yarn and cloth with changing weather conditions.

The very fact of the cotton being delivered to the carder in a tangled mass of fibers presents a rather difficult proposition, and requires a well balanced man in charge. He is expected to bring the product to a certain degree of perfection, otherwise it is impossible to spin an even yarn. Throughout the seven or more different processes he must carry it without damaging the stock, at the same time work it and rework it in an economical manner with a definite end in view, which is to secure an even yarn.

Most young textile graduates do not appreciate the importance of entering a card room after having completed their theoretical education. This part of a textile mill is, to some extent, more disagreeable to work in than the other departments. But if he has the determination to learn, and remains long enough, he will meet the knotty problems; and also realize that by a thorough mastery of the practical as well as the theoretical knowledge of same, he will soon fit himself for a good position.

THE IDEAL LOOM FIXER.

(*Competitive letter to* COTTON.)

BY A. L. A.

Textile machinery is made up of so many small parts, and their relationships are so peculiarly dependent one upon another, and their relative adjustments require such close setting, that good fixers are always in demand; they are like oil on the troubled waters.

It is only right to state that a good fixer must be of a mechanical turn of mind. Simply to know how to run the machine does not imply being a good fixer, although a good fixer should know how to run a machine; he is like a physician who can cure the sick. The fixer's work is like the different medicines, each has its characteristic effect, and when properly applied removes the trouble.

To name some of the specially good qualities of the ideal fixer, we must say that he knows his trade, keeps his machinery in good running order without losing valuable time, and is economical. In other words, like the good rule of proportion, he has three well defined terms in his make-up; he knows how to fix his machines, is quick at his work, and never wasteful. When it is remembered that the officials make the smallest margin of allowance for stoppages when figuring the possible production of machines, it is necessary that the ideal fixer have these qualities well established in his character; for the fixer is between two fires, and his critics are numerous and severe.

Above him are the leading officials who have had their turn at the hammer and the monkey wrench, and they know when good work has been done without seeing much of the man at the bench. Most of the officials above him have reached their respective positions as superintendent, overseers, and second hands by promotion. They have reached the front ranks by virtue of their excellent fixing.

Below the fixer are the operatives who are none the less severe. Most of them are piece workers, and the running time of their machines means bread and butter to them; and woe to the fixer who is not a hustling, quick, genial son of the right metal.

Behind all these qualities the ideal fixer must have good tools, and like the good man with a system he must know where they are so as to have them when needed. On his person he should carry a small screw driver, caliper rule, pocket level, jack knife, pencil, small adjustable wrench, pliers, and whatever else in a small way is adapted to his section. The heavier tools will be orderly packed in a small hand box. The idea of all this convenience is to be provided to fix many trifling disorders without going to the bench for every tool needed for applying the remedy.

When putting parts of machines together he is very careful to make perfect fits and not drive things together so hard that when the time arrives to take machines apart, valuable time is lost and excessive breakages occur. When several parts are being taken down, which will require reassembling, he makes all parts relative and avoids all possible confusion in resetting the machine.

He is efficient with his note book; he is resourceful; he never gets stuck; and he has some way of getting on his feet in the quickest possible time when thrown down by several breaks at one time. This kind of fixer has few drawbacks, because he has the complete sympathy of the help and the officials. They all want the belts on the tight pulleys and are on his side. He will be very popular and is destined to rise when his turn comes. Furthermore, the ideal fixer should take great pride in the quality as well as the quantity of work that comes off of his section, and should ever be alert to detect any faults with his warps or filling, or any short comings on the part of any of the weavers on his section. He should report these irregularities to the men above him. He thereby acquires the habit of assuming responsibility, and it is his ability to shoulder responsibility that determines his future in the mill business.

ELECTRIC DRIVE IN COTTON MILLS.

(*Competitive letter to* COTTON.)

BY S. G.

The electric drive is clean, efficient, and convenient for a cotton mill. With its use we need only a small heating boiler, which does away with the necessity for large quantities of coal, large boiler, and engine room. The amount of coal required in an electrically-driven mill is small, in fact, almost negligible, and therefore coal dust does not settle on and soil everything on the premises.

By intelligently laying out the machinery for electric drive the largest part of the shafting necessary in a mechanically driven mill can be avoided. This greatly reduces the number of bearings to be oiled and watched, belts to be tightened, repaired, and renewed, pulleys slipping, and the friction loss in driving these troublesome parts. With a properly laid out plant, the electric drive is as efficient, except under unusual conditions, as the mechanical drive and in some cases more efficient.

Production is increased from two to six per cent., and in some cases even more by the use of the electric drive. The first reason for this is the elimination of slippage in the numerous belts connecting the engine and the machine. Each group of machinery can run at the most efficient speed, independent of other groups.

Three-phase induction motors for each section of machines, such as spinning frames, cards, looms, etc., seem to be the best practice. In some cases, such as with a warp machine that can be most conveniently set a good distance from any group, the individual motor is applicable; but except in such extraordinary cases, this is carrying the principle too far and makes too many small units to require attention, as cleaning, oiling, etc.

Too large a group on one motor, requiring a large heavy motor, should also be avoided. No set rule can be given, as each case is a separate proposition for the engineer to work out after having the plans of the number of machines, power for each, and how many can be best located. However, as a general rule, about a 50-horse-power motor is large enough, and smaller motors will answer in most cases.

With electric drive arranged in groups, one group can be run independent of all the rest of the mill. There is need, therefore, for a force of men to oil loose pulleys, watch belts, and watch for fire in the idle part of the mill. It would scarcely ever be desirable to run one spinning frame or one speeder, but it would be convenient at times to run a group of spinning frames, cards, or looms, and this could be accomplished with group drive without running any unnecessary shafting, belts, and loose pulleys.

A mill with a good steam plant already in operation would have to have electric power sold to them cheaper than is generally the case to pay them to change and install the necessary apparatus for electric drive. A new mill with a good source of electric power at reasonable rates could do no better than install electric power. A good installation is an hydro-electric plant which allows the hydraulic machinery to be installed in the most convenient place to the source of power and enables the mill to be situated at the most convenient place for its operation. If the mill is located only a short distance from the power plant, transmission at 2,200 volts direct to motors can be used; and if it is located at a long distance a higher voltage can be used for transmission and transformers can be used to step down to the desired voltage for the mill. This is to cut down copper loss in transmission lines. The latter installation is assuming that the company owns a water-power and that they want to furnish power for the proposed mill.

MANAGEMENT OF HELP.

(*Competitive letter to* COTTON.)

BY E. C. G.

In all well organized mills the management of help is centered in the executive office. First, the influence of the president has a great deal to do with help; the attitude in which he holds himself toward the help either draws or drives them away. As an instance, when it is necessary for one of the hands to go to the office to see the president, the treatment accorded him there is very often the deciding point with that hand as to whether he will like the place. Then, too, the president can use his influence with the superintendent in having the village kept in good condition, and make it attractive. Above all, the president should see that, when any one has a grievance, it is settled with due courtesy to all concerned.

Second, the superintendent should overlook the mill in general and see that each overseer treats his help with fairness; he should let his overseers run their respective rooms, and not interfere with their help, except in case of a dispute. He should see to it that the speed of the machinery is kept regular, because an irregular speed very often drives away good hands. Spinning does not run good with irregular speed, neither does carding; and I am sure that irregular speed in a weave room will drive away more help than any other one trouble in the room. The superintendent should therefore see that the speed of his mill is as near one thing all the time as possible.

He should see that the very best supplies are bought for his mill. This is a very essential point in a mill, as good supplies will, more than anything else next to good speed, help to hold good section hands in either room. He should look after the health of his mill village and see that the place is kept in clean and sanitary condition. He should also to some extent look after the moral and spiritual welfare of his people; these points are most essential, as you will often hear the help say that the president and the superintendent are good men, and that they look after the interests of their people. In this way they play a very important part, and aid materially in making the help contented and happy.

Third, overseers should be men of good moral characters to start with; men who conduct themselves in an orderly way before their operatives. They should not talk too much to their help but should give any instructions to them through their second hands. They should accommodate their help when practicable, but be firm with them at all times. However, it is well to temper firmness with kindness. Overseers should at all times be ready to hear complaints from their help and judge their cases impartially; they should see that the time of the operatives is correctly kept, as this is very necessary to keep peace. The help would soon get tired of going to the overseer about their time not being kept correctly and it would create dissatisfaction. Overseers should have no preferences in their room; should treat all alike and see that the machinery is kept clean and in good repair, as operatives like to run clean machinery.

These are the cardinal points in managing help.

PICKERS AND CARDS.

(*Competitive letter to* COTTON.)

BY R. M. L.

Before starting up a picker, first see that your cotton is well mixed. Second, see that your waste to be run in with the cotton is fed in uniformly; do not put it into the hopper in lumps. Third, see that your apron on your openers do not slip. If the aprons slip uneven work will be made. Fourth, see that the required number of laps are kept feeding at the back of your pickers; do not let one run out, for if it does your evener motion will not be able to take proper care of such a wide variation, and there will be thick and thin places in your laps at the front of the machine that will make uneven work and bad running throughout the mill. Fifth, see that all your machines are properly oiled and cleaned. If care is not taken in this respect you are liable to have a fire in your picker room. Sixth, see that all lumps are kept from around the screen cages, as lumps will produce bad selvages and cause your laps to split. Split laps will cause uneven work.

To take up the subject of cards, first see that the card clothing is tight on your cylinder and doffer, and that all wires on the clothing are kept up in their proper places. Second, see that your feed rolls are set properly to your lickerin. The doffer and cylinder must not be set too close but according to the condition of the clothing. If the wire is dull, set a little closer. If your cards are in good condition about eight hours is long enough to grind them.

Now for the setting of cards. First, go to the back of the card, set the mote knives according to the amount of motes and fly you want to take out of the cotton at this point, (my rule is to set the knives to a No. 17 gauge). See that the lickerin screen is in the right circle; if it is not concentric with the lickerin, cloudy work will be made, regardless of how close the other parts may be set. Set your lickerin to the cylinder to a No. 7 gauge and set your feed plate according to the length of your staple. I once knew a carder who was running on 1¼ inch staple and the spinning was running badly. Upon close examination the carder found his feed plate had been set to the lickerin with a No. 7 gauge. The carding looked nice, but the staple was cut. The best rule is to set your feed plate with a No. 12 gauge when running 1¼ inch staple.

The best results in setting the cylinder to the doffer are obtained by using a No. 7 gauge. The flats should be set to the cylinder with a No. 10 gauge. I differ with those who argue that if you can set your flats closer, you get better work.

MARKET REVIEWS.

THE COTTON MARKET.

(*Contributed exclusively to* COTTON.)

BY H. & B. BEER.

We regret to have to report further deterioration in the condition of the growing crop as a result of excessive heat and dry weather in the central and western portions of the cotton belt during the past month; in consequence of which crop accounts are being reduced. In our report of last month, we made mention of all hope for a Texas yield of 3,500,000 bales having been abandoned, and that the chances were against the making of a total crop of 12,500,000 bales. To-day, the Texas crop estimates range from 2,000,000 to 3,000,000 bales, the consensus of opinion being that the State will make about 2,500,000 bales compared with about 3,726,000 last year, while estimates for the total crop of the belt now range from 11,500,000 to 12,500,000. Indications point to less than 12,000,000 bales against about 13,600,000 one year ago. During almost all of August, Texas had failed to receive her usual allowance of moisture, and was already deficient in the matter of rainfall to a great extent. The recent hot wave, being the third and most severe on record, has had a disastrous effect upon the plant.

The Texas crop promises to be not only short of last year by about 1,000,000 bales, but the heat wave has been so severe, that it has caused premature opening of half grown bolls, resulting in a light yield and very short staple. As will be remembered, the government crop report issued August 2nd, showed 71.9, the lowest condition on record for July 25th, against 83 last year, and a ten-year average of 80.6. During the interim, almost ever State in the belt, except, perhaps, Alabama, has suffered deterioration on account of injury to the hill crops by the excessive temperatures and hot winds. Texas is in a deplorable state; Oklahoma, Arkansas, and Louisiana have also suffered, and not a few points in Mississippi and Alabama have complained of late of the plant shedding half-grown bolls as well as blooms. Premature opening of cotton is being reported from all Gulf States.

Benders and extra staple cottons are going to be scarce next season, and we look forward to witnessing very big premiums being paid for long staples later in the season. as the big reduction of 30 per cent. in Louisiana's acreage this year is confined to long staple bottom lands principally. The recent torrid weather will certainly make the yield of rivers rather small in comparison with the production of specialties in past years.

On the other hand trade continues to improve as a result of good cereal crops in the West selling at unusually good prices; the iron and steel industry is active, and railroads are in better shape than they have been in for the past two years. Idle cars are disappearing, being put into commission in increased numbers from week to week, and the chances are, that instead of having a glut of idle rolling stock, the railroads will experience a famine in freight cars this winter.

This more encouraging outlook is spreading to England where trade has been dull for the past twelve months, advices from Manchester being to the effect that there is a better feeling; that there is far more desire to buy, and that there is more demand for goods. Up to the present date, the world this year has taken 13,000,000 bales of American cotton, and will probably have taken about 13,250,000 bales by close of the season.

With opening of the new season, September 1st., the world's visible supply of American cotton will figure about 1,400,000 bales against about 970,000 one year ago, or about 500,000 bales larger than last year. In the event of trade improving, this excess could only meet the requirements of an increased demand. How the requirements of the world are going to be satisfied with a crop of about 12,000,000 bales of American cotton, or perhaps less, when requirements will be for a yield of about 13,000,000 bales,

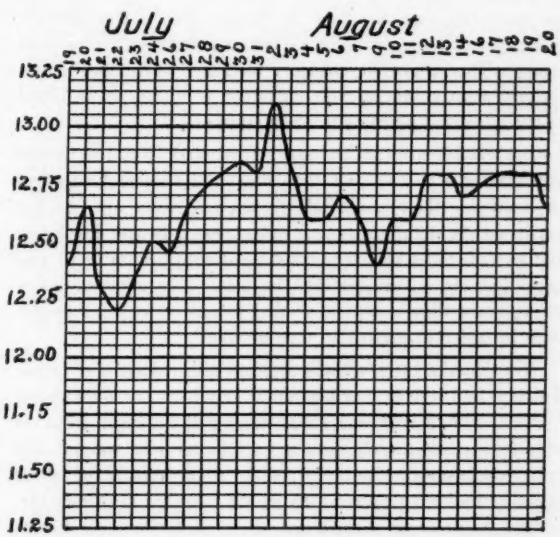


DIAGRAM NEW YORK SPOT COTTON, JULY 19-AUG. 20, 1909.

is a riddle that will have to be solved as the season progresses.

The market hesitates to advance owing to the fear that receipts in September will be heavy, owing to the premature opening of the crop in the Gulf States, and that the demand will not be sufficient to absorb the offerings. As farmers are apt to be free sellers around 12 cents, a temporary decline is not at all unlikely. Nevertheless, we feel fully convinced that there will be no great pressure on the market around current levels, and if the market should decline temporarily, it will offer an opportunity to provide for future requirements on a comparatively cheap basis.

The accompanying diagram shows the fluctuations from day to day of middling upland cotton in the New York cotton market.

As will be seen from the diagram, the price advanced irregularly up to 13.10, which was reached on August 2nd, when the monthly crop condition report was issued by the government.

Notwithstanding the fact that the condition was very

bullish, some of the most powerful operators in the market turned bears, and by August 9th, the price of spots had receded to 12.40. The market then sought a higher level, as indicated.

THE YARN MARKET.

The yarn market during the past month showed very little changes from that noted for the preceding month. Buyers are staying out of the market, and spinners are still very independent; preferring to close down rather than make contracts at present quotations.

The little business that was done during the first part of August was confined to specific counts of yarn; denoting special needs of a few buyers for immediate deliveries. It is true that prices were marked up by sellers in some instances with some degree of approaching the spinners figures, but in most cases the prices were only nominal, and did not represent any real transactions.

Stock yarns continued to play an important part in the situation, and the fact developed that a considerable quantity had been available at reduced figures from quoted prices. This condition naturally restricted inquiries for new business with spinners, who continued to quote prices based on the advanced price of the raw staple.

It also appears that the lack of demand from the buyers was traceable to the fact that they had sufficient supplies on hand for their immediate needs, and were not making commitments at the prevailing quotations. It also developed that several mills had very good sized supplies on hand and were desirous of converting the same into money. As a consequence they accepted shaded prices on current quotations in order to move the yarn on hand.

Very little interest was evidenced in knitting yarns. Knitters had not so much as made inquiries for quotations.

Practically all of the sales during the month seem to have been made at concessions, as a buyer who wanted any yarn was usually able to discover some supply of stock yarns at reduced prices which would meet his requirements.

The mills have maintained their quotations on future business, as they are naturally looking for a return on the increased investment in cotton which has been demanded of them.

The fact that the mills have refused business at lower quotations has had the effect of reducing considerably the supply of stock yarns in dealers hands, although it is claimed that this supply is by no means exhausted as yet.

The last two weeks have witnessed a desire on the part of some of the spinners to consign yarn in order to keep their machinery in operation. The chances are that curtailment will have to become even more general than noted, unless a decided change for the better is shown in the near future. It is expected that with the beginning of the movement of the new cotton crop, the yarn situation will be very much more satisfactory than it has been for a long time.

THE KNIT GOODS MARKET.

Trade in the hosiery market has been quite active during the last month, in the face of advancing prices.

Buyers, while not taking very kindly to the advances, especially as the season opened at lower figures, are making purchases to fill their requirements. The majority of the largest buyers have now made their purchases; most of their business having been given to the larger mills. However, the smaller buyers have been very active in giving business to the smaller mills. Blacks and tans rule the favorites, with fancies and colored goods in seamless lines next in preference.

The first of August witnessed a large quantity of full-fashioned hosiery imported to this country in order to avoid the increased duty that the new tariff bill now imposes on this class of goods. This condition will retard the domestic full-fashioned hosiery trade for at least this season, it is believed.

However, the prices on the domestic line of these goods have not been advanced with the other lines, and now that the tariff question is definitely settled, buyers have been more active in this line than for some time.

The general opinion is that the higher prices of all lines of knit goods are to remain, and will probably work higher if the cotton and yarn market reach higher levels.

The Textile Mill Situation in the South and New England.

SOUTHERN MILL SITUATION.

(*Special Correspondence.*)

With the tariff question settled for awhile, trade conditions in all lines of the textile industry in the South are decidedly more encouraging. There is a more general feeling of confidence in the expected early restoration of normal conditions, and mill men are more optimistic. There has been no phenomenal improvement to date, but rather a steady upward climb since the adjournment of Congress. The Southern mill man seems to be very well satisfied with the outcome of tariff legislation. There was a great noise raised all over the South when it was proposed to alter the yarn schedules; Southern mill men declaring that since the South made most of the coarse yarns, it would be manifestly unfair to cut the schedules on coarse yarns, while increasing duties on the finer grades, made in the North.

August will go on record as the month in which Southern mills curtailed most heavily. All over the South many mills closed down for periods ranging from one to two weeks, and in some instances longer. The North Carolina Cotton Manufacturers' Association, and other Southern associations, had recommended that mills curtail or close down during a part of August. This was thought advisable in order that stocks on hand might be reduced, employees given a rest, and much needed repairing made to machinery. Being the most suitable part of the year for operatives to take a rest, most of the mills have given their hands vacations. In view of this heavy curtailment, therefore, it is believed that September will start off with better conditions prevailing than any month this year. With orders on hand, and others in prospect, and with stocks greatly reduced, it is believed that with the usual impetus of fall trade, the trend of trade will be steadily upward.

Chief interest of the past month centered in the meeting of the Southern Soft Yarn Spinners' Association at Asheville, N. C., during the month of August. The meeting was well attended, and perhaps the most important action taken was that looking to further curtailment of production. Not only have soft yarn men had a bad time of it for the past two years, but hard yarn spinners have also suffered from the prolonged depression. Even yet conditions are bad, but the outlook is brightening. Most of the hard and soft yarn mills have been curtailing heavily and will continue to do so on into and some of them through September. No definite plan of curtailment was adopted at the Asheville meeting, but it is understood that directors will later inform members of the association of what plan of action they deem wisest.

The situation affecting soft yarn men was summarized in the following interview: "With cotton at present prices there is no spinner in the association who can produce yarns at a profit unless he happens to have his cotton on hand. Many mills have been closed down, and reports have been coming in of many others that contemplate similar action. This condition, however, we believe is temporary. With the tariff settled, mill men are of the opinion that business will now improve more rapidly until prices of the manufactured product are on a parity with prices of the raw material."

An official of the Southern Hard Yarn Spinners' Association gives it as his opinion that conditions will improve sufficiently rapid to warrant continued operations among most of the hard yarn mills through a greater part of September, if not through the entire month.

As noted previously, one of the most remarkable features of the mill business in the South has been the almost unprecedented activity in new mill construction work since the first of the year. Reports have just been made public which show that many new mills have been established during the first six months of the year. Last year North Carolina led in this work, and again leads during this period; 25 new mills have been established in that State since the first of the year. Massachusetts comes second with 22, and New York third with 18. Not only have many new mills been organized and set going this year, but, more remarkable still, thousands of new spindles have been added to established mills. In view of the depression that has prevailed in trade almost the entire year, and regardless of the apprehension caused by anticipated unfavorable tariff legislation, mill men have demonstrated their confidence in the future of the industry by heavy investment in mill equipment. Improvements that even held up during the late depression are now being carried out.

Of the 25 new mills established in North Carolina since the first of the year, 23 were cotton factories, one was a woolen mill, and one a knitting mill. South Carolina built nine cotton mills, Georgia twelve and Alabama six.

Numerous other mills are under contemplation in the South and it is expected that the work of building new mills and adding spindles to old ones will continue throughout the remainder of the year at the same rate.

An interesting investigation is being conducted by President Thomas F. Parker, of the Monaghan Mills, at Greenville, S. C., into the hook worm disease among his several hundred employees. He has employed a capable physician, and is conducting the investigation on a large scale. The results of his investigation into this disease, which is prevalent in the Carolinas, as well as other Southern States, will be watched with interest by mill men.

That diversification would benefit the cotton mills is an idea recently expressed by a well known mill man. Among other things he said: "The time has come to advise owners of cotton mills to diversify. Too many cotton mills in the South make the same product, with the result that when the demand falls off for that product, there comes a general shut-down. Years ago, when the industry was in its infancy, the mills made what could be made the easiest. Too many Southern mills continue in that old way. Diversification means more steady demand for goods, better returns on capital and better wages."

A Northern gentleman who has studied Southern mill conditions had this to say along the same line: "It seems remarkable that, with all its facilities, there is not one single printing corporation established in the South, while in the North and especially in the East there are a number of such concerns. Either the cotton or the cloth must be shipped one thousand miles or more from the South to Eastern cities, there to be manufactured and printed, and then reshipped to the South or middle west where the market is for the great bulk of these goods, especially in the lighter grades of goods, such as 64 square printers, etc. The great part of this cloth is manufactured in the South. There is no more reason why this cloth should not be printed in the South than that the goods should not be manufactured there; but there is every reason why they should be printed in the South at a handsome profit. The freight alone of something like 60 cents on the one hundred pounds represents a good profit in itself; then, there is cheap land, moderate taxes and the great advantage of water-power which is being developed at the present time."

NEW ENGLAND MILL SITUATION.

(*Special Correspondence.*)

The textile markets continue to exhibit a broadening tendency in the New England States, notwithstanding the general advances in all lines of fabrics, and every indication is favorable for a healthy, normal condition for some time to come. Business is somewhat restricted in lines that have had several price advances during the month, but the broad Western demand for fine goods and sheetings more than offsets any temporary reaction. All textile plants are now operating full time. Wages are being increased in isolated textile towns. Commission men have confidence in the future, and prices are gradually approaching a basis of current raw material quotations. Labor is getting a trifle uneasy in the fine mill centers. New constructions are announced in every issue of the textile press, and the mill shares market holds strong.

The above resumé of the situation in this section is a true definition of prosperity,—not only textile prosperity, but general economic prosperity. This glorious country of ours has emerged from the pall of depression with all colors flying, and to-day there is a steady progessive march toward unparalleled prosperity accompanied with great commercial and industrial activity. Our conservative New England bankers, can not see a cloud in the sky. They are backing their judgment with millions of money that are being spent for commercial and industrial expansions.

Every manufacturer of machinery and building materials in the New England States is rushed and crowded with orders. Everywhere there is great industrial activity.

The writer is giving facts when he states that there never was a time in the history of the cotton industry in this country when there was so much economic progress as to-day. Cotton mills are increasing their facilities for production so extensively and machine builders are so rushed that it is difficult to purchase the necessary equipment with any degree of certainty as to when it will be delivered.

Reduction of cost in production is resulting in combinations, working agreements, and greater "community of interests." The Riverside and Dan River Cotton Mills at Danville, Va., have merged into one corporation; the Pacific Mills of Lawrence, Mass., have taken over the Cocheco Mills of Dover, N. H., and are about to take over the Merrimack print and bleaching departments; and it is current rumor that Amoskeag Mills of Manchester, N. H., are negotiating for the large gingham mills of the Lancaster Co. at Clinton, Mass.

During the next 12 months we shall witness many consolidations and mergers of cotton mills, all of which will strengthen the cotton industry in New England, and add energy and vitality to the great prosperity that this country is to experience during the next five years.

The Whitin Machine Works are sold one year ahead on looms for fine goods mills that are going into New Bedford and other textile centers. Crompton & Knowles Loom Works are sold up to January 1st on gingham and plain cotton looms, and nine months ahead on silk looms. In fact, this company was offered a bonus for a delivery of silk looms early next spring, which offer was rejected. The large plants of the Draper Co. are taxed to their utmost, and orders are booked far into 1910, with but very few bookings left for this year's delivery. Stafford Co. and the Fall River loom builders are having a greater demand than they can supply for silk looms for the Pennsylvania and New Jersey silk trade. Belting manufacturers and makers of general textile mill supplies are all well filled with orders and generally sold ahead for several months.

Among labor, there is a slight ripple in the otherwise placid waters, because the Grosvenordale Mills at Grosvenordale, Mass., and several other plants have increased wages this month, while in the larger textile centers there has been no suggestion of increased wage schedules. The New Bedford spinners are uneasy and will shortly make demands upon the manufacturers for 10 per cent. increase. Under the sliding scale of wages in Fall River there can be no agitation until there is a greater margin of profit to the manufacturer.

Ginghams are having a splendid season. The Boston Mfg. Co., of Waltham, Mass., opened up its gingham line the last of July, and inside of two weeks they were sold up to January. The representative of its selling house carried the line out West and in a trip through the central Western States sold all but two houses. These ginghams approach the Anderson ginghams more closely than any other made in this country and they are having a great run. This mill has made, in four years, profits equal to twice its capital stock. In 1905, with a capital stock issue of $400,000, it had outstanding loans of $1,201,000. On March 1st, this year, it had reduced its debts to $660,000; and during this period had spent nearly a quarter of a million on new machinery, extensions, and improvements. In 1905, this mill was nearly bankrupt; to-day, it is one of the big money earners. It has recently increased its capital to $600,000 to provide funds for new machinery which, when all installed, will give a total equipment of 2,000 looms and 73,000 spindles or a capitalization of $8 per spindle with a replacement value of $27 per spindle.

This brief sketch of the prosperity of this mill, which is the oldest in the United States, having been organized prior to 1800 and operating the first power loom in this country in the year 1815, is given as an illustration of the remarkable recuperative power of textile plants and the results of excellent management applied to an unsuccessful cotton mill.

The fabric market is more or less spotty. Manufacturers are not inclined to accept contracts at present prices because of the conviction that prices will be very much higher as soon as cheap cotton is used up and new cotton purchased. Spot goods hold firm at best prices. Prints are steady at advanced quotations, and there is good Western buying of the 64 squares. All the spot goods are absorbed and nearby deliveries taken. Heavy goods are dragging; but the undertone is firm and better prices are looked for in September. Southern goods are in better demand at improved prices.

There has been but little export trade to the Orient during the month. The South American trade has taken quite a quantity of 20 yard pieces of ticking through Bliss, Fabyan & Co., and wide sheetings for late winter delivery. Free trade with the Philippine Islands has stimulated the demand for prints, and every cargo since the passage of the bill has contained a greater proportion of cotton fabrics than ever before. Our share of this trade has been only about nine per cent. of the consumption, but it is probable that under the free trade law, our share will at least double. Our total domestic exports of cotton goods to the middle of August amounted to $12,600,000 as compared with $7,400,000 for the same period last year.

Textile mill shares have held firm at best prices all through the summer months. Brokers can not begin to supply the demand, and every time there is an offering of the gilt edge issues the sale is made at higher prices than the previous sale. There have been no increased or extra dividends declared by our larger New England mills this summer, and yet investors are eager to buy these securities at prices that give them an income return of about the same as savings banks. There is no difficulty in disposing of additional issues of stock, while new promotions are eagerly snapped up. All of the $500,000 common stock of the Maverick Mills of East Boston, Mass., has been taken by the promoters, while Hayden, Stone & Co., bankers and brokers of Boston, has taken the preferred stock issue. The several new mills under way at New Bedford are all financed and no further offering of stock to the public will be made.

Fall River stocks hold firm at highest prices with no offerings. New Bedford stocks are scarce and too high, based upon present dividends.

New Bedford, Mass. ranks first in the United States in the manufacture of fine cotton goods and fine yarns; and second in the number of spindles in its cotton mills.

FALL RIVER MILL DIVIDENDS.

The list of dividends declared by the mills in Fall River, Mass., for the third quarter has been issued by G. M. Haffards & Co. and shows that on a total capitalization of $26,525,000, excluding the Ancona common of $200,000 and the increased capital of the Davis mills and the Sagamore Mfg. Co., the average rate for the quarter is 1.61 per cent., equal to a total disbursement of $408,650. This is at the rate of 6.44 per cent. per annum.

For the second quarter of the year, $396,400 was paid out in dividends, equal to 1.59 per cent. on a capitalization of $26,525,000. The distribution for the first quarter of the year amounted to $681,400, equal to 2.73 per cent. on a total capitalization as above with the same exclusions.

The outlay for dividends for the fourth quarter of last year was $370,642, equal to 1.45 per cent. on the same total capitalization. For the third quarter of last year, the sum of $399,642, 1.6 per cent. on a capitalization of $25,475,000.

It can be seen by the above figures, says the "Journal of Commerce and Commercial Bulletin," that the dividend disbursement for the third quarter of this year was $12,250 greater than the second quarter; but $272,750 below the disbursement of the first quarter in this year, and $7,008 greater than the third quarter of last year.

It is interesting to note that there is only one gray goods concern in Fall River that is not paying a dividend, that being the Lincoln Mfg. Co. It is not expected that this corporation will pay a dividend for some time to come, because it was only organized in 1907.

Two of the distinct features of the statement for the third quarter are the increases of ½ per cent. in each of the rates of the Bourne and Wampanoag mills, which are now on a 6 per cent. dividend basis. The Barnaby Mfg. Co., which is a gingham concern and not classified with the gray goods mills, paid a dividend of 1 per cent., the first in six years. This is the only corporation in the tabulated list that is paying below a six per cent. basis. The dividends declared for the third quarter are the same as those of the second quarter with the exception of the Bourne, Wampanoag and Barnaby Mfg. Co.

The Troy Cotton & Woolen Co. paid the highest rate, of 3 per cent. This corporation is capitalized at $300,000, divided into 600 shares with a par value of $500 a share. This agrees with the rate paid the second and first quarters of this year. The Union Cotton Mfg. Co., which paid 1½ per cent. for the third quarter of this year, paid 25 per cent. for the first quarter and 1½ per cent. for the second quarter. This corporation usually pays a large rate for the first quarter.

The showing made by the mills for the third quarter is by no means a bad one. The mills were confronted with a lagging print cloth market up to about the last of June, but it is hoped that the showing that will be made for the last quarter of this year will be much better than the one presented for the third quarter. The mills are well engaged with contracts which will take them through the remaining months and in some instances to the new year. The fluctuations in cotton have been a source of considerable annoyance to the mills, for it is on the condition of the cotton market that cloth calculations are based and upon which contracts are computed.

While there have been no extra cash disbursements declared during the third quarter, the Troy Cotton & Woolen Co. has awarded the stockholders a 100 per cent. bond cash dividend. The 25 per cent. stock dividend which was declared some time ago by the directors of the Davis Mills was given. The directors of the Cornell Mills have a plan which will be outlined at a special meeting of the stockholders. It is stated that a cash dividend in the neighborhood of 25 or 50 per cent. will be made.

The outlook for the next few months is encouraging, although at the present time the demand for the product of the mills has tapered off. That is natural enough, as this is considered a quiet period in the cloth trade, and such an easing off as is occurring is expected. The following list of dividends is furnished by G. M. Haffards & Co.:

DIVIDENDS FOR THIRD QUARTER.

Names of Corporations.	Capital.	Rate.	Amount.
American Linen Co.	$800,000	1½	$12,000
Ancona Co.	‖100,000	1½	1,500
Arkwright Mills	450,000	1½	6,750
Barnard Mfg. Co.	495,000	1½	7,425
Bourne Mills	1,000,000	1½	15,000
Border City Mfg. Co.	1,000,000	1½	15,000
Barnaby Mfg. Co.	350,000	1	3,500
Chace Mills	1,200,000	2	24,000
Cornell Mills	400,000	2	8,000
Conanicut Mills	†300,000	1½	3,775
Davis Mills	1,250,000	‡1½	7,500
Davol Mills	500,000	1½	7,500
Flint Mills	¶580,000	1½	8,700
Granite Mills	1,000,000	2	20,000
Hargraves Mills	800,000	1½	12,000
King Philip Mills	1,500,000	1½	22,500
Luther Mfg. Co.	350,000	1½	5,250
Laurel Lake Mills	600,000	2	12,000
Merchants Mfg. Co.	1,200,000	1½	18,000
Mechanics Mills	750,000	1½	11,250
Narragansett Mills	400,000	2	8,000
Osborn Mills	750,000	1½	11,250
Parker Mills	800,000	1½	12,000
Pocasset Mfg. Co.	1,200,000	1½	18,000
Rich. Borden Mfg. Co. ..	1,000,000	2	20,000
Sagamore Mfg. Co.	1,200,000	§2	18,000
Seaconnet Mills	600,000	1½	9,000
Shove Mills	550,000	1½	8,250
Stafford Mills	1,000,000	1½	15,000
Stevens Mfg. Co.	700,000	1½	10,500
Tecumseh Mills	750,000	1½	11,250
Troy C. & W. Mfg.....	300,000	3	9,000
Union Cotton Mfg. Co....	1,200,000	1½	18,000
Wampanoag Mills	750,000	1½	11,250
Weetamoe Mills	500,000	1½	7,500
	$26,525,000		$408,650

An average of 1.61 per cent. on the above capital excluding Ancona common and increased capital of Davis Mills and Sagamore Mfg. Co.

†Authorized capital. ‡Paid on capital of $500,000. §Paid on capital of $900,000. ¶Capital increased May 24, 1909, to $1,160,000. ‖Also $200,000 common.

What is your hobby in the textile business? Write a letter for our Prize Contest about it.

One of the expensive and difficult parts of cotton growing is the picking of the crop, due to the peculiar character and the small number available, of those who dwell in the cotton belt. Negro help is becoming scarcer and more independent each year.

The picking of the cotton crop in this country requires the labor of not less than 1,500,000 persons—men, women and children, working constantly every day for four months.

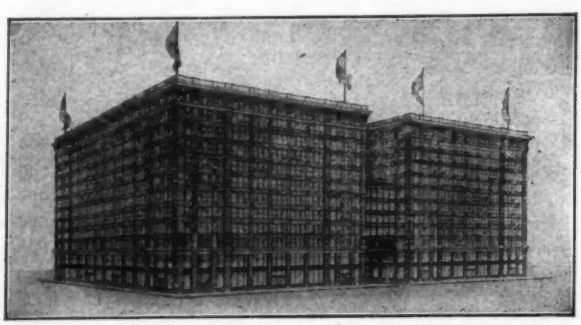
The principal imports to the Philippine Islands are cotton manufactures, the value of which in 1908 amounted to $7,138,672, of which $590,730 was from the United States.

NEW MACHINERY AND TRADE NOTES

MERCHANTS' AND MANUFACTURERS' EXCHANGE OF NEW YORK.

One of the latest projects in New York is a plan for the establishment of a Merchants' and Manufacturers' Exchange, which will constitute the largest commercial exchange in the world. The enormous twelve-story twin buildings to be occupied by the exchange will cover two entire blocks between Forty-sixth and Forty-eighth Streets, and Lexington Ave. and Depew Place. There will be approximately 30 acres of floor space available for salesrooms of manufacturers.

The general plan is patterned after that of the New York Furniture Exchange, which for twenty years has been the Eastern selling headquarters of more than 300 manufacturers of furniture. Its success in attracting tens of thousands of dealers annually has fully demonstrated the advantage gained by centralization of sample salesrooms. This organization has taken 500,000 square feet in the Merchants' and Manufacturers' Exchange buildings, and will be a part of the centralized market created by the new exchange.



MERCHANTS' AND MANUFACTURERS' EXCHANGE BUILDINGS.

The new exchange will greatly simplify the work of the thousands of buyers who come to New York, by providing a complete exposition of the different lines of samples under one roof.

The advantage to manufacturers having their goods in such an exchange where buyers will be naturally attracted by the very volume of display is at once apparent.

This great enterprise will thus bring the manufacturers and the merchants together in numbers that would be impossible by any other method.

The two colossal buildings to be erected for this purpose are, as a matter of fact, part of the new $20,000,000 Grand Central Station, the terminal of two great railroad systems, as well as stations of the present subway, of the New Jersey and Long Island tunnels, and the projected Lexington Avenue tube. The location is in the very heart of the city. These buildings are to be erected by the New York Central, and the New York, New Haven and Hartford Railroads for the Merchants' and Manufacturers' Exchange. Their architecture will be uniform with that of the Grand Central Station and they will represent a value of $6,500,000.

In these buildings, space will be leased to manufacturers in amounts to suit, for display and sales purposes. Here they will be housed with their various lines, combining to make a centralized market place of great magnitude and importance.

Among the comforts and conveniences to be provided, will be a well-appointed club, including reading, writing and private rooms, and a roof garden restaurant for the entertainment of visiting buyers. The three lower floors of one building will be devoted to an assembly hall for trade conventions requiring a large area for the display of goods, machinery, etc., of each trade at the time of each convention.

The great financial strength of the Merchants' and Manufacturers' Exchange, and the huge interest behind it, combine to give this movement a great importance. Over one-half of the 1,300,000 square feet is already spoken for, and by the time the buildings are ready for occupancy, it is thought that the entire space will have been spoken for.

The offices of the Merchants' and Manufacturers' Exchange, during the construction of their great buildings, will be in the Grand Central Palace, Lexington Avenue, at Forty-third Street, New York.

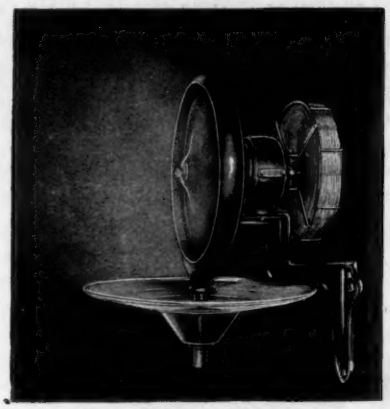
HYGROSSO HUMIDIFIER.

So fully has the necessity for a humid atmosphere been recognized by textile manufacturers, that within a short time a number of methods for moistening the atmosphere have come in the market. In some instances we find more or less complicated machinery installed for this purpose, requiring the attention of mechanics; whereas in other instances, similar results are accomplished by very simple constructed devices, placed direct in the rooms of the mill where additional humidity is required. A humidifier of this latter type is the "Hygrosso" a description of which was published in these columns some time ago. The Hygrosso is operated either by belt drive or by direct connected motor drive.

A feature of the business of the Hygrosso has been its repeat orders. The manufacturer has furnished six complete installations since January, 1909 to one of the largest print goods manufacturers in the world, which includes apparatus for humidifying more than four million cubic feet of air space.

The growing demand for the Hygrosso is further evidenced by the orders received during the last thirty days. The Hygrosso is characterized by its extreme simplicity in construction and its economical operation and efficient results.

A few points of interest in connection with this humidifier are: Rapid distribution of moisture in the form of a fine mist; accurate and easy adjustment and regulation;



THE HYGROSSO HUMIDIFIER.

simple construction; easily taken care of; no fouling of the apparatus, entailing frequent cleaning out; small amount of power required; and moderate initial cost.

Each head can be operated independently which is often a great convenience. It vaporizes 25 per cent. of the water employed. No pump is required. No air pressure tank of float valves are needed. No strainers are employed. No atomizer nozzles are required. Every thing is open, and no cleaning is necessary. The power required is about ⅛ horsepower per head. Single head installations are relatively as cheap as groups. These humidifiers can be installed in any part of the mill. Hygrosso humidifiers have recently been installed in the following plants: The Fall River Iron Works Co., Fall River, Mass.; The Dunmore Silk Co., Scranton, Pa.; A. G. Turner, silk throwsters, Willimantic, Conn.; Cheney Bros. silk manufacturers, South Manchester, Conn.; A. J. Cameron & Co., worsted spinners, Philadelphia, Pa.; Pelgram & Meyer, silk throwsters, Boonton, N. J.; The Tamarack Co., Pawtucket, R. I.; Leader Weaving Co., Central Falls, R. I., and The Banna Mfg. Co., Goldville, S. C.

The illustration shown herewith gives an idea of the appearance of the direct connected motor driven Hygrosso humidifier, and any further information desired on this subject may be obtained from the manufacturer, John W. Fries, 45 Lafayette Street, New York.

RECENT PUBLICATIONS.

PROGRESS AND PROFIT FOR MILL MEN, by Henry D. Martin, is a new publication by a thoroughly practical mill man. The work is a compilation of different articles written at different times by Mr. Martin, most of which were previously published in some of the textile papers. These articles have been arranged in logical order, and present very thorough discourses on the various mill problems. The keynote of the different articles is economy in the mill, which phase is dealt with very thoroughly as only a practical man could. The work is especially valuable to prospective superintendents and even to those who have already won their positions, as the different problems dealt with are those found in the every-day routine of a cotton mill superintendent. The price of this work is $1.00 postpaid. All orders will be filled upon receipt of the price at this office.

THE AMERICAN TEXTILE DIRECTORY FOR 1909-10, published by Lord & Nagle, has just been issued. The issue has been gotten up in a very pleasing and convenient manner. It is composed of six parts: Part I, relating to textile manufactures; Part II, yard trade index; Part III, bleaching, dyeing, printing and finishing; Part IV, raw materials, etc.; Part V, manufacturers' selling agents and dry goods commission houses in the principal cities of the United States; Part VI, mills classified according to goods made. Different sections of the books are printed on different colored papers for convenience in finding the different sections. The work is published in two editions.

HENLEY'S TWENTIETH CENTURY BOOK OF RECIPES, FORMULAS, AND PROCESSES. This book, published by the Norman W. Henley Publishing Co., of New York City, is a valuable work, containing nearly ten thousand selected scientific, chemical, technical formulas, and processes for use in the laboratory, office, shop, and in the home.

In preparing such a complete work, a great deal of care is necessary to have the matter practical, accurate, and modern.

The book appeals to one on account of the easy practical preparation of the recipes, etc., without a wide technical knowledge of the subject.

DAVIDSON'S HOSIERY AND KNIT GOODS TRADE DIRECTORY FOR 1909-10. The nineteenth annual edition of this directory has just been published. This edition is complete in every detail and contains some novel features which make it more valuable than ever. Besides giving all the knit goods manufacturers in the United States, it gives information regarding their plants and products. The classified directory is a valuable part of the book. This classified directory gives a separate list of manufacturers under the heading of goods made. The following lists are also included in the volume: Manufacturers of knitting yarns; knitting yarn dealers; dyers; manufacturers' agents; New York offices of mills; New York offices of jobbers; hosiery and knit goods jobbers; and hosiery and knit goods retailers. Textile maps covering New England, Middle Atlantic, Middle Western, and Southern States, are provided near the back of the book; also a list of railroads on which all of the towns and cities mentioned in the directory are located. Orders will be received at this office, and the book forwarded upon receipt of the price. Office edition $3.00, pocket edition $2.00.

THE FIRST NUMBER of the Journal of the Manchester Municipal School of Technology Textile Society has just been issued.

The Journal is in every way a decided credit to the Society, and especially to those members who contributed the articles on such well selected subjects. Some of the subjects taken at random are: Various Twists in Yarn; Effects, by J. M. Hey, J. Mutch, and J. Smith; The Northrop Loom, by William Whittaker; The Effect of Twist upon Yarns, by James Winterbottom; The Conditions of Mill Life in India, by G. N. Dewal; The Ventilation and Hu-

midification of Factories and Workshops, by Prof. Radcliffe, M. Sc. Tech.; and others.

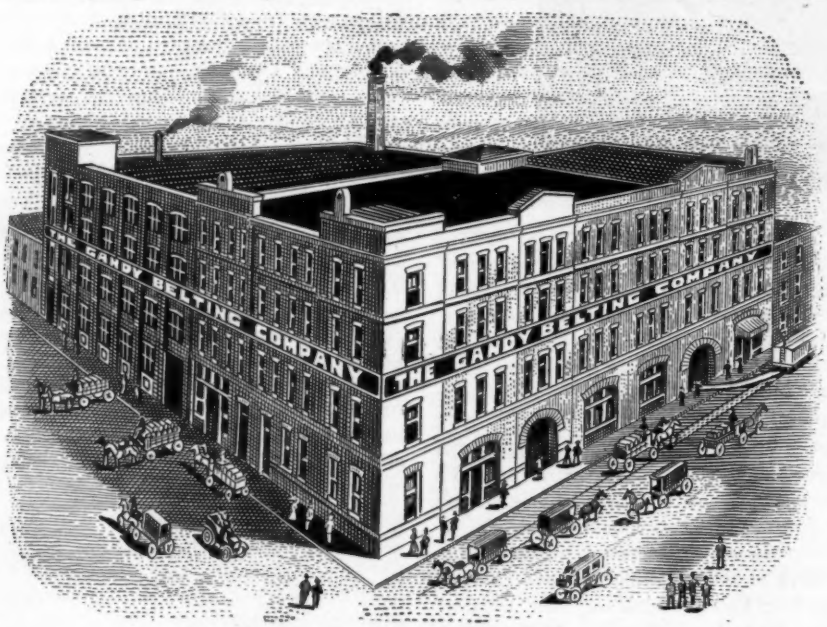
The Journal is the fulfilment of a long cherished plan for establishing a means of communication between those students of the department who are scattered practically all over the world.

However, the interest in the Journal will not be confined to the alumni of the school, as the subjects treated are of importance to every textile manufacturer.

THE GANDY BELTING CO.

The Gandy Belting Co., of Baltimore, Md., is erecting a large four-story addition to its plant, and when completed will be the largest factory in the world devoted to the manufacture of cotton duck belting. This building has a frontage of 110 feet and extends back 104 feet, and has four stories. It is of slow burning or New England mill construction, each floor being divided into three bays, of 25 feet span each, and one bay of 30 feet span, their capacity being 300 pounds per square foot, live load. The columns are of Georgia long leaf pine. The floors are four inches thick, made of three inches of yellow pine, and one inch of maple, for the top. Three fireproof stairways are provided, and also an electric elevator, run by a three-phase induction motor. There is a complete system of plumbing and electric wiring, so arranged that connections and extensions can be made as required, to suit any conditions that may arise. A 30,000-gallon steel water tank, located on top of this building supplies a complete sprinkler system, to which an improved fire pump is also connected.

A large portion of the floor space is devoted to the specially constructed stretching apparatus of the Gandy Belting Co. It should be understood that the stretch in canvass belts is one of the most serious draw-backs to be overcome in their manufacture; this point is given careful attention by means of special machinery for the purpose. The foundation of the Gandy belts is a very heavy duck woven in the company's own duck mill, according to specifications adopted thirty years ago and never since changed. Exhaustive tests have proved conclusively that this peculiar weave of duck is eminently suited for belting purposes. It gives an even strain throughout. An interesting feature of the Gandy factory is the sewing-machine equipment. These machines were built in its own machine shop, under the company's own patents. One of these machines stitches with an imbeded stitch, resulting in a smooth surface for the belt and at the same time welding the plies more solidly together. After stitching, the belt is treated to a secret process which renders it water, heat, and steam proof. This process produces a very durable belt for driving, elevating, and conveying purposes. The Gandy Belting Co., carries a stock of over 1,500 rolls of straight roll belting in all sizes from one inch, four ply, to 30 inch, ten ply, for the purpose of filling orders promptly. This company also has agencies in Yokohoma, Japan; Shanghai, China; Capetown, South Africa, and in several of the important cities of the European countries.



FACTORY OF THE GANDY BELTING CO.

THE NORTH CAROLINA AGRICULTURAL AND MECHANICAL COLLEGE. The textile department of the college has just issued a college record, which contains some excellent views of the equipment of the college.

The textile building is built according to regular mill construction, and is fully equipped for thorough instruction in cotton manufacturing.

Three courses of instruction are offered, namely: Four-year course, two-year course, and eight-weeks courses in carding, spinning, and weaving. The eight-week courses are designed especially for mill men who desire to supplement their practical experience with a study of mill calculations, etc. These courses begin with the first week in October and January of each school year.

DRAPER CO., HOPEDALE, MASS. The July bulletin, No. 81, of "Cotton Chats," is a very optimistic sheet, and relegates the tariff bugaboo from further consideration, with one bold headline.

Anticipating the era of prosperity, a large amount of new capital is being put into new cotton mill equipment both for new mills and additions to established plants. The question of the kind of machinery to purchase is a very important consideration, and should receive very careful attention. In these days of close competition it is of vital importance that the best of everything in labor-saving machinery be used. The Draper Co. does not manufacture spinning frames, but is a pioneer in handling improvements to these machines, which have revolutionized the art of cotton spinning, and saved millions of dollars to the country. The special parts, which will be furnished in connection with any spinning frames if specified to the builders, are as follows: Centrifugal clutch spindles, which hold the bobbins at a uniform level; mirror rings, which give satisfaction from the very start; Speakman lever screws, which are very convenient in adjustment; Rhoades-Chandler separators, which enable the use of larger rings and longer traverse; and Shaw and Flinn lifting rod cleaners, which prevent wear and sticking of rods.

CASSELLA COLOR CO., 182 FRONT ST., NEW YORK CITY. The July issue of "Dyestuffs" is before us. "The Question of Fast Dyeing" is discussed by A. Kertesz, in a rather lengthy and interesting treatise. Among the other articles in the issue may be mentioned "Practical Versus Chemical Tests" by C. J. Ecob, "The Month's New Colors" and "The Month's New Color Card." A copy of the July "Dyestuffs" may be had upon application to the Cassella Color Co.

SULPHUR BLACK ON HOSIERY. One of the greatest difficulties which confronts the hosiery dyer is to produce a sulphur black with a rich bloomy shade and finish. This is impossible with the use of dyes alone, as the sulphide of soda necessary to put the dyestuff into solution acts upon the fabric destroying its natural feel and finish.

Scholler Bros. Co., Amber and Westmoreland Sts., Philadelphia, Pa., manufactures an article called Brilliantone, which acts upon the dye, developing it into a rich bloomy shade, and puts back into the cotton the organic matters which the sulphide of soda has dissolved out in dyeing. Goods after-treated with this article give upon pressing a good, lustrous finish, and handle so much desired by the trade.

The same results are obtained on colors and aniline black when after-treated with Brilliantone.

Samples and prices will be cheerfully given upon application to the manufacturer.

THE TERRY STEAM TURBINE CO., 90 WEST ST., NEW YORK CITY, has just issued an attractive catalogue describing its Terry low-speed steam turbines. The details of these turbines are fully described in the reading matter and by means of illustrations, and important information relative to this style of machine is also given in the catalog. Various types of the Terry steam turbine are illustrated, namely: the single stage Terry steam turbine, the two stage condensing Terry steam turbine, the 150 K.W. turbine generator, the 300 H.P. Terry steam turbine direct connected 5-stage boiler feed pump, the 180 H.P. Terry turbine, driving centrifugal pump, and the 75 H.P. Terry steam turbine blower. A copy of the catalog will be mailed upon application to the Terry Steam Turbine Co.

AMERICAN EXPOSITION IN BERLIN, 1910. An American Exposition under private auspices will be held in the city of Berlin, Germany, during the months of April, May and June, 1910, in the well known Exposition Palace near the Zoological Gardens, located in the most frequented part of the city. It is expected that prominent citizens and business men on both sides of the Atlantic will co-operate to make this exposition successful; and the European management will be in the hands of men previously experienced with expositions. It is the opinion of many prominent Americans that this exposition will offer manufacturers an excellent opportunity to exhibit their products in Germany and increase their foreign sales; and that the exposition as planned will increase the commercial relations between the German and American nations.

POWER SPECIALTY CO., 111 BROADWAY, NEW YORK CITY, is the sole agent of Duval metallic packing. This packing is designed especially to be used in connection with high pressure steam or superheated steam. It is made of fine white alloy wire accurately plaited in square form. This wire is of special composition, calculated to obtain the maximum strength and elasticity with a minimum of friction and wear. This packing is very tough, and will resist enormous pressure and maintain a tight joint without bearing unduly against the rod. Its heat resisting properties are such that it can not burn when submitted to the highest temperatures. It is not affected by rust, which greatly increases its life and also prevents injury to the rod when the piston is inactive. It will maintain a tight joint against any water pressure up to 5,000 pounds per square inch, also against any temperature up to 900 degrees Fahrenheit. It may also be used on rods moving as fast as 1750 feet per minute. Among the various machines upon which it can be used may be mentioned: stationary engines, pumping engines, air compressors, vacuum pumps, gas engines, oil engines, marine engines, accumulators, hydraulic pumps, and locomotives.

THE WESTERN ELECTRIC CO. has received a contract from the Chinese government to supply a complete common battery telephone plant for the city of Pekin. Heretofore almost nothing in the way of telephone development has been accomplished in China. There have been telephones in only a few of the cities, and these largely in the foreign quarters, which were served by small out-of-date systems.

The two switchboards sold by the Western Electric Co. to the government are the first common battery boards in the entire empire, yet China has an estimated population of over 400,000,000. Our own country, with a population but one-fifth as large, has more than 1,000 telephone exchanges larger than the two intended for Pekin, besides fully 15,000 smaller ones in smaller cities and towns. This gives some idea of the magnitude of the field still to be opened up in the far East.

The order amounts to about $150,000, and covers a complete telephone plant of the modern type, including several hundred thousand feet of lead-covered aerial and underground cable.

THE CROCKER-WHEELER CO., OF AMPERE, N. J., has recently booked several large orders for direct current apparatus. One of these from the Indiana Steel Co., calls for 70 mill motors, totaling about 2400 H.P. This order is an addition to the 11,000 H.P. of Crocker-Wheeler motors employed at the present time by this company. Another order from the Gould Paper Co., of Lyons Falls, N. Y., calls for electric drive for a new paper-making machine which it is about to install. A sale has been made to J. M. Kohler Sons Co., Sheboygan, Wis., of one 750 K.W. 250 volt D. C. generator. The King Bridge Co., Cleveland, O., recently placed

an order for one 150 K.W. compound wound 250 volt generator to be used for supplying light and power. Another sale made to the American Lace Mfg. Co., Elyria, O., covered one 100 K.W. 250 R.P.M. generator. The Bethlehem Steel Co. has recently added to its 8800 H.P. of Crocker-Wheeler motors, by an order for a 225 H.P. compound wound motor, to be installed at its Saucon plant. An order received from Beadleston & Woerz, New York City, covers 187 H.P. in compound wound 115 volt motors, and one 150 K.W. 125 volt compound wound generator. Among orders for induction motors recently received by the Crocker-Wheeler Co. is one from Roessler & Hasslacher Chemical Co., Perth Amboy, N. J., which totals 295 H.P. in 3-phase 60 cycle 480 volt motors of the squirrel cage type.

THE LOMBARD GOVERNOR CO.'S representative, Harold H. White, was a recent caller at COTTON'S Atlanta office. Mr. White reported the prospects for a large fall business as most encouraging.

THE ROB. SCHAELLIBAUM CO., OF PROVIDENCE, R. I., maker of patent grids for cotton openers and lappers, is now represented in the Southern territory by L. W. Wright. The headquarters of Mr. Wright at present are in Anniston, Ala., but will be removed to Atlanta, Ga., at an early date.

W. E. CALDWELL CO., LOUISVILLE, KY. This firm manufactures wooden tanks, and operates its own sawmill for cutting its own cypress lumber used in its wooden tanks. This sawmill is located at Red Fish, La., where the company has secured a fine tract of cypress timber which will supply its needs for years to come. The properties of cypress which make it valuable for this work are all set forth in the catalog. The various types of tanks manufactured by this concern are illustrated and a complete price list given. Illustrations of different installations of the Caldwell tanks in various parts of the country are also embodied in the catalog.

JOS. DIXON CRUCIBLE CO., JERSEY CITY, N. J. The July issue of "Graphite" is before us. The issue contains an article on "Genealogy, Dixon's and Others," which is written in a very interesting style; and among other things mentions that Ex-President Roosevelt's name is derived from the Dutch, and means a field of roses. The continued article on "Preventing Corrosion of Steam Machinery" by W. H. Wakeman is of interest to engineers. A number of interesting facts gleaned from an article on "Our Billion Dollar Smile" published in the "Success" Magazine are also given. Other interesting articles are: Care of the Gas Engine, Burnt Money, Removing Corroded Nuts, Hints for New York Sightseers, and others.

THE PHILADELPHIA BOURSE has maintained an exhibition department for many years. Various kinds of machinery and appliances are exhibited and sold there. Several improvements have been made, such that have decidedly increased the attractiveness of this department, one feature being the installation of a new lighting system, consisting of groups of tungsten lamps, which make the entire floor very bright and more attractive. The department maintains a service which cleans the machinery every day, and takes care of all telephone calls, and is always ready to answer any questions or inquiries pertaining either to the department or to concerns not located in the department.

The results obtained by the firms exhibiting in this place have been very satisfactory. Particularly is this true with the gas and gasoline engine firms. Some of the firms represented in the marine engine line are the Jager, Bridgeport, Mianus, Hall, Palmer, Niagara, Ferro, Atlantic, Buffalo, Gray, Standard, Sterling, Barber, Stanley, Oriole, and Hettinger. Firms exhibiting stationary engines are the Otto, Alamo, Kenton, Mietz & Weiss, and the Hornsby-Akroyd.

With these engines, both marine and stationary, set up for running, any one interested in the subject of power can see these engines in actual operation. There are also steam engines, milling machinery of every description, tools of all kinds, boilers, feed water heaters, separators, etc. Steam is furnished at 100 pounds pressure for steam engines, pumps, etc., and electric current is also furnished.

The following concerns have recently placed exhibits and offices in the exhibition and selling department of the Bourse: L. J. Wing Mfg. Co., New York, fans and boiler room equipment; Brown & Sharpe Mfg. Co., Providence, R. I., tools; August Mietz, New York, gas and oil engines; De la Vergne Machine Co., New York, gas and oil engines, refrigerating and ice-making machinery; Hires Engineering Co., Philadelphia, Pa., steam pumps; John G. Horton, Philadelphia, Pa., patent barrels and by-products; Trenton Engine Co., Trenton, N. J., steam engines and gas engines; American Diagraph Co., St. Louis, Mo., stencil cutting machines.

OTIS ELEVATOR CO., NEW YORK CITY. The July issue of the "Indicator," published by the Otis Elevator Co., contains a number of pleasing articles and illustrations. The Department of Agriculture's new building is one of the subjects discussed. The Otis Elevator Co. was awarded the contract to install six electric passenger elevators; three in each section of the building. The machines are of the double screw type and are placed on foundation beams at the top of the hatchways. The duty is 2750 pounds maximum and 2250 pounds at a speed of 275 feet per minute. The travel of the cars is from basement to the fourth floor, a distance of approximately 60 feet.

Excellent views of two hotels in Honolulu are given in this issue, together with descriptions of Otis elevator service installed. Other subjects treated are "Otis Elevators in Foreign Countries," "Counter-Balance," "Wedge Clamp Safeties" and others.

WESTERN ELECTRIC CO., NEW YORK CITY. The increase in the business of the Western Electric Co., if it be a correct indicator of country-wide prosperity, shows that good times are already in full swing. On the basis of seven months returns, the company is operating at the rate of $46,000,000 per annum, which shows a gain of 38 per cent. over the same period last year. The greatest gains in sales are shown by the Middle West section. The Pacific Coast section shows the next greatest improvement, and the Eastern Coast only a comparatively slight improvement. The obvious reason for this is, that the Middle West section covers a much larger territory than either the Eastern Coast or the Pacific Coast region.

The export business for the first six months of this year was about equal to that of last year, but the June export business amounted to about twice the business of the preceding June. The business of the foreign houses of the Western Electric Co. shows about a 20 per cent. increase for the seven months as compared to the corresponding

seven months of last year. The July returns show the same steady increase which the entire year has exhibited to date.

MURALT & CO., Engineers, of New York City, has been awarded the contract for furnishing and installing the electrical equipment of the new municipal lighting and pumping plant at Berlin, Md. Power will be generated and transmitted throughout the city by means of a 2200 volt two-phase alternating current system. The alternators will be of the belted type, and will be driven by gas engines supplied by producer gas. Step-down transformers reducing the line potential to 110 volts will be provided at the centers of distribution from which the city lighting circuits will be fed.

THE B. F. STURTEVANT CO., OF HYDE PARK, MASS., a corporation with a capital of $500,000, has been reorganized and recapitalized. The new corporation is organized under Massachusetts laws with $1,250,000 6 per cent. cumulative preferred stock, and $1,250,000 of common stock. The stock has all been taken by a few of the large owners. John Carr, chairman of the board of directors of the First National Bank, is president, Eugene N. Foss is treasurer, and E. B. Freeman has been elected general manager. The increased capitalization represents capital expenditures during the past year, largely in the erection of a new plant in Hyde Park which cost over $1,500,000. The B. F. Sturtevant Co. has been doing a business of about $3,000,000 a year.

WESTINGHOUSE TURBO-GENERATOR for large Southern cotton mill. A 2500-kilovolt-ampere Westinghouse alternator, driven by a 2000-kilowatt Westinghouse steam turbine, has been ordered for furnishing light and power service to the Erwin Cotton Mills at West Durham, N. C. The steam element operates at 175 pounds pressure and exhausts into a vacuum of 27 inches. The power distribution will be made with three-phase, 60-cycle current at 600 volts.

THE CROCKER-WHEELER CO., Manufacturers and Electrical Engineers of Ampere, N. J., announces that it will open an office in the Ford Building, Detroit, Michigan, on or about September 10th. Charles W. Cross will be the manager of this branch.

THE NINTH ANNUAL FIELD DAY of the Draper Co. employees was held at Town Park, Hopedale, Mass., on Saturday, August 14th. Every year the Draper Co. closes down its works for one day to give its employees the opportunity of holding a Field Day.

An interesting athletic program was arranged, including different running races, bicycle races, swimming races, lawn tennis matches, canoe races, baseball, etc. Music was furnished during the day by the Hopedale Brass Band.

A competent corps of officials kept the different events moving, according to a previously arranged schedule. The official program was printed in convenient pamphlet form. All information pertaining to the different events was given. There were four different prizes for practically all of the events. A baseball game in the afternoon brought the Field Day to a close.

WOODWARD, BALDWIN & CO., of New York, will in future carry on business under a new partnership. The old partnership has just expired and a new one has been formed with the following members: Elijah P. Smith, William H. Baldwin, Summerfield Baldwin, Sr., Summerfield Baldwin, Jr., Isaac P. Rodman, J. Worthington Dorsey, Willard A. Baldwin, Henry B. Shute, Jr., and William J. Westcote.

The last four partners named are new members in the firm, who have been associated with the house for a number of years.

THE MANUFACTURING OF FINISHING COMPOUNDS, sizings, and starches of all kinds for the textile industry has been the specialty of the Arabol Mfg. Co., 100 William St., New York City, for years. Experience and science have helped them to turn out products to suit any particular needs of the trade, and their goods have the reputation of being all that is claimed for them. Besides their own manufactures, they handle china clay, chloride of magnesium, imported potato starch, etc.

THE J. H. WILLIAMS CO., manufacturers of wire heddles, heddle frames, shuttles, reeds, and other mill supplies, has recently moved its plant from Utica, N. Y., to Milbury, Mass. Improved machinery will be added to the new plant in Milbury and the company will be better equipped than ever to fill orders.

BERLIN ANILINE WORKS, NEW YORK CITY, has just issued some very interesting pattern sheets relating to their new dyes. Brilliant Congo Blue B, BFL, 5 R, and Brilliant Congo Violet R, are used for cotton dyeing, and form the subject for one sheet which gives the proper method of dyeing and the characteristic properties of the dyed cloth. Sulphur Olive B extra, Sulphur Brown O extra, and Sulphur Brown O B extra, form the subject for another sheet. These dyes are used for fast dyeing on cotton without after-treatment. Dyed samples are also included on the different sheets. Guinea Fast Yellow R, used for wool dyeing, is thoroughly explained with its different properties. A fourth sheet contains an explanation of Chrome Fast Yellow 2 R extra for wool dyeing.

THE GANTT AUTOMATIC PILING MACHINE was described in the August issue of COTTON. This machine is sold by Arthur P. Hall, S. B., consulting chemist and engineer, 40 State St., Boston, Mass.

THE LAGONDA MFG. CO., of Springfield, Ohio, makers of the Weinland boiler tube cleaners, automatic cut-off valves, and other boiler room specialties, announces the opening of a new branch office in the Postal Telegraph Building, Chicago, Ill. J. P. Maloy, who takes charge of the new office, is probably one of the best known boiler men in the country. In this department he will be assisted by F. H. Field, who was formerly connected with the St. Louis office of the Lagonda Mfg. Co., and who has had several years' experience in cleaning boilers.

THE TORRINGTON (CONN.) ELECTRIC LIGHT CO. is adding a 500-kilowatt Westinghouse turbine-generator set to its power station equipment, which has hitherto comprised a 300-kilowatt General Electric Curtis turbine set and a 500-horsepower Harris engine direct connected to a Stanley generator. The station supplies a lighting and power service with 60 cycle three-phase current at 2300 volts.

PETTINGELL-ANDREWS CO., OF BOSTON, MASS., manufacturers of electrical apparatus, issues a monthly pamphlet known as "Juice." The August issue contains an illustrated article on "The Advantages of a Proper Joint," one on "Macbeth Glassware," and others. Price lists of its different kinds of wire are given, tungsten fixtures are illustrated and prices given, and other apparatus is illustrated and explained.

The advantage in keeping "Juice" on file is that it shows new goods, which will not appear in catalogs earlier than three to six months.

MILL NEWS.

Notices of mill projects, additions or improvements are solicited for this department.

Arkansas.

EARL. A new cotton mill with a capital of $50,000 has been organized by N. B. Graves. The equipment will be 10,000 spindles and 300 looms ultimately; only a portion of this equipment will be installed at first.

LITTLE ROCK. A plan for a 20,000 spindle cotton yarn mill has been formed by Max Helman, Frank T. Longley, and H. A. Bowman; capital stock, $300,000.

Connecticut.

DANBURY. The Tweedy Silk Mills will build a new brick factory, 110x175 ft. This company manufactures silk hat bands.

JEWETT CITY. The Ashland Cotton Co. will add a two-story, 200x100 ft., weave shed to its present factory.

NORWICH. The Ponemah Mills Co. will build an addition, consisting of a building one-story high, 670x200 ft. The building will be of heavy mill construction with saw-tooth roof. The estimated cost is $225,000.

Delaware.

DOVER. The Standard Woolen Mills Co. has been incorporated to manufacture and sell woolens and other merchandise. The incorporators are Emil Wojan and Sidney Mayer, of Brooklyn, N. Y., and Moses G. Rosenberg of Worcester, Mass. The capital stock is $500,000.

Georgia.

ALBANY. The Albany Cotton Mills are having plans completed for a plant to contain 10,800 spindles and 280 looms for weaving print cloths. The main building will be 400x185 ft., four stories high; warehouse will be 100x150 ft. This company is capitalized at $250,000; W. W. Pace, president.

ATLANTA. Fulton Bag & Cotton Mills have awarded the contract for the erection of a picker building, 60x150 ft., to Gude & Walker, of Atlanta, Ga. The architects are Shand & Lafaye, Columbia, S. C.

COLUMBUS. Columbus Mfg. Co. has awarded the contract for the erection of a new building, in addition to its present plant, to T. C. Thompson & Bros., Birmingham, Ala. The addition will be 272x128 ft., four stories. The equipment of the enlarged plant will be 55,000 spindles, and 1,600 looms for weaving white goods.

COLUMBUS. The Muscogee Mills are having plans made for operating the plant exclusively by electric power. It is expected that the change will be completed by the first of the year. About 500 H. P. will be required.

ELBERTON. The Elberton Cotton Mill, successor to Swift Cotton Mill, operating 7,440 spindles and 210 looms, has purchased pickers, cards, drawing, fly frames, spoolers, slashers, etc., to the amount of $15,000. W. O. Jones, Pres.; I. G. Swift, Vice-Pres., and P. M. Hawes, Secy-Treas.

GRIFFIN. Spalding Cotton Mills will enlarge its plant; the details of the addition not having been definitely decided upon as yet. This mill now operates 12,000 spindles and 400 looms, for fancy weaving.

THOMASVILLE. The organization of a cotton mill company is proposed for this place by E. M. Mallette, J. H. Merrill, and J. S. Montgomery.

Kentucky.

LOUISVILLE. The Puritan Cordage Mills have begun operations with a daily capacity of 500 lbs. of sash cords. This company is capitalized at $60,000; its equipment includes 2,000 spindles, rope machinery, electric motors, etc. Chas. T. Wolfe, Pres.

PADUCAH. Cohankus Mfg. Co. will make improvements to its plant, including repairing its mechanical department, and the installation of several new machines. It now operates 6,000 spindles, 30 cards, etc., manufacturing yarns and rope.

Louisiana.

MONROE. W. B. Smith, Ruston, La., is reported as planning the organization of a company to build a $50,000 cotton batting mill.

Massachusetts.

EAST BOSTON. Contract for the building of the large cotton mill of the Maverick Mills Co. has been let.

FALL RIVER. The Bay State Cotton Corporation has been incorporated under the Massachusetts laws, with a capital of $1,500,000. This corporation will combine the Warner Cotton Mills, of Newburyport, the Lowell Weaving Co., of Lowell, and the LeRoy Cotton Mills of LeRoy, N. Y. P. T. Jackson, Jr., Treas., Boston, Mass.

LAWRENCE. The Arlington Mills are doubling their power capacity by the erection of an addition to their present plant. The new building will be 148x60 ft., with a concrete chimney 250 ft. high. Eight new boilers, having an aggregate capacity of 4,000 H. P. will be installed when the new building is completed.

LOWELL. Merrimack Mfg. Co. has obtained a permit to build a weaving mill to cost $50,000.

NEW BEDFORD. The New Bedford Cordage Co. was recently partially destroyed by fire. It is reported that the directors of the Soule Mill will build an addition to the plant to cost about $100,000. About 300 additional looms will be installed.

NEW BEDFORD. Whitman Mills; work has been commenced on the weave shed and cloth room which are to be added to these mills. The building will be 400x580 ft. The weave shed will be one-story and will contain approximately 1,000 looms. The cloth room will be two stories, and will be connected with the main plant by a bridge from the cloth room of No. 2 mill. The addition is being erected by Chas. B. Maguire Construction Co., Providence, R. I.

NEW BEDFORD. Nashawena Mills have awarded the contract for the additions to the mills to B. F. Smith Construction Co The additions will be a four-story structure 130x790 ft., a storage house 69x125 ft., three stories high, and a picker house 100x200 ft., two stories high. Work on the weave shed is progressing rapidly. The plant when completed, will probably be one of the largest in this city.

NORTH ADAMS. The Berkshire Hosiery Co. is a new concern established by E. A. Richardson of this city.

NORTH BROOKFIELD. Oxford Linen Mills Co. will enlarge its present plant with a building 700x120 ft., four stories high; and another building 600x80 ft., four stories high.

PROVIDENCE. The Warren Mfg. Co. is placing looms in its weave shed. Fine cotton sateens will be made.

Michigan.

EATON RAPIDS. Horner Bros., are arranging to double the capacity of their woolen mills. They will install a new 300 H. P. engine in addition to the steam and water power now in use. Additional machinery will be installed within the next ninety days.

SAGINAW. Clare Knitting Mills, Clare, Mich., are planning to remove their plant from Clare to Saginaw as soon as a new building can be completed. The costs of the building and the removal from Clare are estimated at $40,000. The new building will have 18,00 ft. of floor space.

Mississippi.

MERIDIAN. The Priscilla Mills, a branch of the Alden Knitting Mills, New Orleans, La., will soon be ready for operation. This mill is equipped with 100 knitting machines, and will have a daily capacity of 600 doz. pairs of hose. O. A. Moers of the New Orleans plant will locate in Meridian as manager.

Missouri.

KANSAS CITY. Goodenow-Brookfield Knitting Co. has organized with J. Frank Goodenow, Pres., Secy and Treas.; Arthur D. Brookfield, Mgr.; Rudolph Mueller, Supt. This company has a capital stock of $10,000, and will manufacture knit coats, using electric power. Main office, 211 Westport Ave., Kansas City, Mo.

New Hampshire.

CONCORD. The Monadnock Blanket Mills, organized to manufacture cotton, woolen, and other fabrics have filed articles of agreement at the office of the Secretary of State. The capital stock is $60,000; the incorporators are Edward B. Richardson, Marlborough, N. H.; Chas. H. Pease, and Fanny L. Applin, Boston, Mass.; Orville S. Caine, and S. Irene Turner, Keene, N. H.

NASHUA. The Wonalancet Co. has recently bought land located about a mile from Nashau Junction on the Boston & Maine R. R., where, it is stated, a main building will be erected 200x100 ft., and a store house 300x100 ft.; the cost to be $150,000. F. Thurber, Pres., Nashua.

New Jersey.

LAKE VIEW. The Textile Building Co., Paterson, N. J., has been organized for the purpose of erecting a large silk mill here, at a cost of about $250,000. The incorporators are Henry, William, Henry, Jr., and Raymond Doherty, and Harriett Schoonmaker. The mill will be occupied by the Henry Doherty Silk Co.

RIVERSIDE. The Riverside Hosiery Mills are planning an addition to their mills which are operated by Christian Dick.

New York.

HORNELL. The Merrill Hosiery Co. will erect a $50,000 silk mill, 80x200 ft., one-story high. The mill will be planned by J. Mills Platt, Rochester, N. Y.

RICHFIELD SPRINGS. The Waiontha Textile Co. will erect an addition to its plant 50x160 ft., three stories high.

JOHNSTOWN. The directors of the Johnstown Knitting Mill Co. are reported as considering the erection of an addition to their plant.

TROY. Cluett, Peabody & Co., collar manufacturers, contemplate the erection of a large bleachery. Reports state that the

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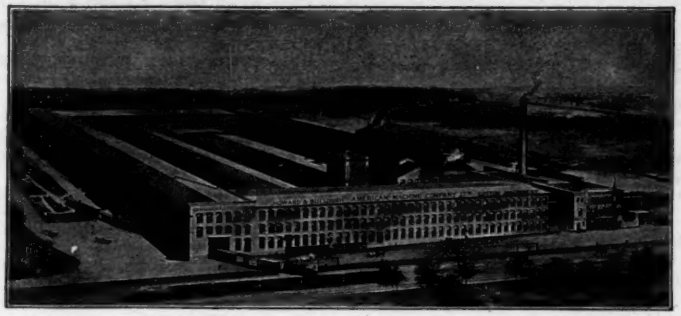

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bleachery will cost about $300,000. E. Harold Cluett of Troy, N. Y., will have charge.

North Carolina.

BESSEMER CITY. Mascot Mills are being overhauled preparatory to beginning operations at an early date. John F. Scott, Supt.

BESSEMER CITY. Akron Mfg. Co., incorporated with a capital stock of $150,000, is to acquire the Vermont Mills, and has been organized with A. E. Moore, Pres., Gastonia; J. H. Mayes, Vice-Pres., Charlotte, N. C., and W. W. Glenn, Secy.-Treas., Bessemer City. The Vermont Mills are equipped with 5,000 spindles and 96 looms.

CHERRYVILLE. The Gaston Mfg. Co. is installing 48 40-in. Draper looms and one beaming frame.

CHARLOTTE. Benj. R. Gornto & Co., 30 Church St., N. Y., representing silk manufacturers, is corresponding with the Greater Charlotte Club, relative to the establishment of a silk mill at Charlotte. A $200,000 plant is contemplated.

CHARLOTTE. Jasper Miller & Sons Co. has been incorporated with a capital stock of $20,000 to manufacture cotton batting The incorporators are Jasper Miller, C. L. Miller, O. L. Watts, and Mrs. Minnie Miller.

CLIFFSIDE. The Cliffside Cotton Mill will add 30,000 cotton spindles and 420 looms to its present equipment of 10,000 spindles and 1,080 looms; these when installed will give the plant an equipment of 40,000 spindles and 1,500 looms. Two slashers and one elevator will also be added.

CONCORD. Jno. A. Blackwelder, owner and operator of the Ashley Mfg. Co., Newberry, S. C., has leased a building in this city and will install knitting machinery at an early date.

DURHAM. The Erwin Cotton Mills' new buildings are progressing rapidly, and will probably be completed in the early fall. The spinning room will be 200x518 ft.; the weave room 307x303 ft.; and the picker room 87x92 ft. The machinery will include 50,000 spindles and 1,500 looms.

FOREST CITY. The Dixie Knitting Co. has been incorporated with a capital stock of $2,500, and will erect a knitting mill. Ten knitting machines will be installed. C. A. Meekin, W. W. Hicks, G. P. Reid and W. C. Bostick are the incorporators.

GASTONIA. The Flint Mills are adding 2,000 spindles and carding machinery to their equipment.

GREENSBORO. The Pomona Mills which were incorporated in April with a capital stock of $350,000 have organized with J. E. Latham, Pres.; W. C. Boren, Vice-Pres.; W. M. Hunt, J. C. Watkins, W. C. Boren, J. A. Latham and E. P. Hardin, directors. This company has acquired the Pomona Cotton Mfg. Co. for $280,000. About 9,000 ring spindles and 300 narrow looms are installed.

HENDERSON. The Harriett Cotton Mills No. 2 is installing 10,000 Whitin spindles, and 32 Whitin cards, with the other necessary machinery. Electric drive will be used.

HENDERSON. The Henderson Cotton Mills will build a No. 2 mill, to be equipped with 10,000 spindles, etc. This plant now operates 28,992 ring spindles and 216 broad looms. Its products are sheetings and hosiery yarns.

HICKORY. Ivey Cotton Mills Co. has begun the construction of a two-story, additional building, 75x168 ft. The equipment will consist of 200 looms which will double the weaving capacity. The present equipment is 7770 ring spindles and 200 broad looms. Its present output is sateens and yarns.

KANNAPOLIS. Cannon Mills: Looms are now being installed in the weave room of these mills. Towels will be the chief product. A large addition is also being built to the bleachery.

LAURINBURG. Waverly Cotton Mills Co. is to begin spinning by Sept. 1st. This company will operate 20,000 spindles for the production of hosiery yarns, Nos. 16's to 30's. Electric power will be used. J. P. McRae, Pres. The mill is under the same management as the Scotland Cotton Mill, and Dickson Cotton Mills of Laurinburg.

LEXINGTON. The Dacotah Cotton Mills, the Nakomis Cotton Mills, and Wennonah Cotton Mills have contracted with the Southern Power Co. for electricity. Contract for the electrical machinery has been awarded to the General Electric Co. at Schenectady, N. Y. About 2,000 H. P. will be transmitted. C. A. Hunt, Jr., Pres., of each cotton mill. The three mills operate a total of 33,760 spindles and 1,082 looms.

LINCOLNTON. The Saxony Spinning Co. has approved the plans for a one-story, 75x360 ft. building. This company is capitalized at $100,000; Edgar Love, Pres. It will have an equipment of 10,000 spindles.

MARION. D. D. Little who is to build a cotton mill in this city reports that the foundation for the mill is about completed, and that brick laying will begin at once. The building will be ready for the machinery at an early date.

MONROE. The Icemorlee Cotton Mill has its No. 2 mill building about ready for machinery. This additional building is 75x350 ft.; it will be equipped with 5,000 spindles, and run by electricity. The product will be cotton yarns.

ROANOKE RAPIDS. The Patterson Mills Co. will erect a two-

story 105x568 ft. building for the installation of 22,000 spindles, 750 looms, dyeing and finishing machinery, etc. The mill will be operated by electricity, requiring about 1,000 H. P. Lockwood, Greene & Co., Boston, Mass. are the architects in charge. S. F. Patterson, Gen. Mgr.

ROCKINGHAM. Entwistle Mfg. Co. has been incorporated with a capital stock of $500,000., by Wm. Entwistle and George E. Entwistle, both of the Pee Dee Mfg. Co. This company will build a mill to be equipped with 40,000 spindles and 1,000 looms. William Entwistle, Pres.; W. B. Cole, Vice-Pres. and Gen. Mgr.; and Geo. E. Entwistle, Secy.-Treas.

WINSTON-SALEM. F. T. Parker, Houston Tex., is interested in the formation of a $75,000 company to build a mill for manufacturing press cloth for oil mills.

ZIRCONIA. The Green River Mfg. Co. has installed 2,280 spindles and other additional machinery. The previous equipment was 7,300 ring and 2,500 twister spindles, driven by electricity.

Oklahoma.

OKLAHOMA CITY. The Farmers' Union of Oklahoma contemplates the organization of a cotton mill company. It proposes to capitalize the company at from $100,000 to $500,000 and have all members of the association become subscribers to the stock of the company. W. J. Houchin, Oklahoma City, is directing the proposition.

Pennsylvania.

ALLENTOWN. The Swissonia Knitting Mill is planning the erection of a three-story addition to its plant, which will measure 20x63 ft. John J. Taylor, owner.

Rhode Island.

MANVILLE. The Manville Co. will build an addition to its weave room, 150x200 ft. This building will accommodate from 800 to 1,000 looms. The bleachery will also be enlarged by additions and by using some of the space occupied by looms in the main mill.

PROVIDENCE. The Colored Worsted Mill will erect a one-story building 34x100 ft., and another one-story 38x99 ft.; both will be used for manufacturing purposes. W. A. Chapman Co. has the contract for the work. Thos. Evans is the architect in charge.

PROVIDENCE. The Crompton & Knowles Loom Works will erect an additional building to its plant, the addition to be a three-story building, 50x80 ft.

PROVIDENCE. The American Silk Spinning Co. has started operations and expects to soon have a force of 600 operatives.

South Carolina.

ANDERSON. The Cox Mfg. Co. will install looms to weave yarns now produced by its 25,00 ring spindles. The capital of the company was recently increased by $150,000 in order to add looms to its equipment.

ARCADIA. The Arcadia Mill has awarded contract to the J. F. Gallivan Building Co., Greenville, S. C., for the erection of an additional building. This building will be 105x255 ft.; it will be equipped with 10,000 spindles and 250 looms, for manufacturing sheeting. The addition will cost about $225,000.

CALHOUN FALLS. Calhoun Mill has increased its capital from $400,000 to $600,000, and will build an addition to the mill to be equipped with 10,000 spindles and 200 looms. The contract for the building has been awarded to John S. Grandy & Sons. Greenville, S. C. The mill expects to have machinery in operation by January 1910. This company now has 15,384 spindles and 400 looms. It will be fully equipped for manufacturing wide print cloths.

CHESTER. The Springstein Mill has recently changed from steam to electric power. The mill will probably use between 600 to 700 H. P.

EDGEFIELD. The Beaver Dam Mills have been incorporated, capital stock $200,000, by B. F. Zimmerman, W. E. Beattie, Lewis W. Parker, and others of Greenville, S. C.; W. W. Adams, T. H. Rainsford, and others of Edgefield. This company takes over the Edgefield Mfg. Co. which was recently purchased by Lewis W. Parker for $75,000. It has 5,000 ring spindles, and 350 broad looms. About $10,000 will be expended for the erection of a new mill building, two stories high, 100x80 ft. This addition will have sufficient equipment to double the capacity of the plant. B. F. Zimmerman, Pres.

GOLDVILLE. The Banna Mfg. Co. is constructing an additional building of brick, 100x162 ft., to cost $15,000. This addition will be equipped with 4,096 spindles and 250 looms, costing $40,000. Contract has also been awarded for operatives cottages costing $5,000. The Shand Engineering Co., Columbia, S. C., is in charge of the enlargements.

GREENVILLE. The McGee Mfg. Co. has resumed operation after being idle for nearly one year. This plant previously made blankets, but will now make a high grade of woolen goods. H. T. McGee, Pres.; C. M. McGee, Secy.-Treas.

GREENVILLE. The Reedy River Mfg. Co., near this place, was bought by W. J. Thackston, Lewis W. Parker, E. A. Smythe, and others of Greenville, S. C., for $149,400. The equipment of the plant consists of 12,000 spindles, 371 looms, mill buildings, warehouses, etc.

GREENVILLE. Conastee Mill has been incorporated with a capital stock of $200,000 by W. E. Beattie, Ellison A. Smythe, Lewis W. Parker, and Thos. I. Charles.

GREENWOOD. The Grendel Mill will increase the company's capital stock from $350,000 to $500,000; the proceeds will be devoted to the building of a new mill at Greenwood with a capacity of 10,000 spindles and 250 looms.

GREENWOOD. F. S. Evans and associates of this place are planning the organization of a $500,000 company to build a cotton mill.

INMAN. The Inman Mill is now installing 13,600 spindles and 350 looms. This equipment will be in position by Sept. 15th, giving the company a total equipment of 33,000 spindles and 850 looms.

LOWNDESVILLE. E. W. Harper is interested in a plan to build a cotton mill here.

NEWBERRY. The Newberry Cotton Mill has awarded the contract for the erection of an $125,000 addition, to the Gallivan Building Co., Greenville, S. C. The addition will be 80x100 ft., two stories. C. C. Davis has the contract for building fourteen cottages for the mill.

ROCK HILL. The Wymojo Yarn Mills will hold a meeting of stockholders on Sept. 11th to increase the capital stock from $150,000 to $300,000. These mills are now operating 5,400 ring spindles by electric power in the production of lace curtain yarns.

SPARTANBURG. The Pacolet Mill has increased its capital from $2,000,000 to $3,000,000. The additional stock will be offered pro rata to the present stockholders. V. M. Montgomery, Pres.

WALHALLA. The Hetrick Hosiery Mill has been organized with a capital stock of $33,000. William A. Hetrick, Pres.; R. T. Jaynes, Vice-Pres., and Chas. S. Hetrick, Secy.-Treas. This company is a consolidation of Wm. A. Hetrick & Bro., Philadelphia, and the Oconee Knitting Mill, Walhalla. The Hetrick plant has been removed from Philadelphia to Walhalla and the enlarged mill has 158 knitting machines; it also has the necessary dyeing and finishing apparatus for a daily output of 800 doz. pairs of hosiery. Chas. Chipman's Sons, 88 Leonard St., New York City, selling agents.

Tennessee.

LOUDON. Loudon Hosiery Mills will increase the capacity of their plant. They are now operating 108 knitting machines and the necessary dyeing apparatus for the production of seamless hosiery. Plans and specifications for the addition have been accepted from the architects, Baumann Bros., Knoxville, Tenn.

MEMPHIS. The American Bag Co. will build a mill for the manufacture of bag cloth; this will be used by the bag company for manufacturing into bags. The company recently issued bonds for $250,000 to cover the cost of the cotton mill.

MEMPHIS. The Central Textile Corporation has been organized with a capital of $1,000,000. W. H. Carter, Pres.; O. H. P. Piper, Vice-Pres.; P. Stenning Coate, Secy. This corporation owns a mill equipped with 25,000 spindles and 800 looms, manufacturing narrow sheeting. The mill is equipped with electricity and uses about 1,000 H. P.

ROCKWOOD. The Rockwood Mills will soon complete a $10,000, one-story, 60x200 ft., brick building, and expect to have the machinery installed by October. Adams & Schneider, Chattanooga, Tenn., are the contractors. The machinery to be installed includes 100 footers, 170 ribbers, 30 loopers, etc.

Texas.

DENISON. The Denison Cotton Mill Co. has increased its capital from $150,000 to $350,000. This additional capital will be used for making improvements and purchasing adding machinery. The company is at present operating 13,000 ring spindles, 4,600 twister spindles, 30 broad looms, and 240 narrow looms, for the production of duck.

McKINNEY: A cotton mill has been proposed for this city and efforts are being made to interest an experienced cotton manufacturer to join with the McKinney capitalists in the organization of a company. McKinney has a population of over 10,000 and is located in a prominent cotton producing county. Manufacturers are invited to address W. B. Carnes, Secy., Commercial Club, McKinney, Texas.

MERRIMAC: The Merrimac Mfg. & Trading Co., is planning the construction of a mill, and proposes to install gas engines. It will erect acid proof earthen warehouses. This mill will use low-grade cotton and cotton linters, manufacturing artificial silk and hair. The company is capitalized at $100,000. C. N. Garrett, Pres., P. O. Box 648, Dallas, Texas, is prepared to correspond regarding building and machinery.

Virginia.

CHASE CITY: Walker & Bro., Wilson, N. C., will establish a knitting mill in this city.

(Continued on page 84.)